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**Sampling Plan for Event 1B  
for the Commencement Bay Nearshore/Tideflats Superfund Site -  
Hylebos Waterway Problem Areas**

**Final Report**

July 7, 1994

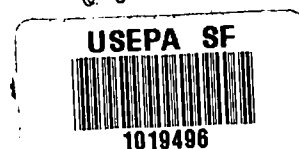
**Prepared For The Hylebos Cleanup Committee Which Currently Consists Of:**

ASARCO, Inc.  
Elf Atochem North America, Inc.  
General Metals of Tacoma, Inc.  
Kaiser Aluminum & Chemical Corporation  
Occidental Chemical Corporation  
Port of Tacoma

**Prepared By:**

Striplin Environmental Associates, Inc.

AR 1.2.1





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 10  
1200 Sixth Avenue  
Seattle, Washington 98101

July 13, 1994

Reply to  
Attn of: HW-113

Paul Fuglevand  
Dalton, Olmsted & Fuglevand  
19017 120th Ave. NE, Suite 107  
Bothell, Washington 98011

RECEIVED  
JUL 15 1994  
SUPERFUND REMEDIAL BRANCH

RE: Approval of Sampling and Analysis Plan Addendum for Event 1B  
Hylebos Waterway; Commencement Bay Nearshore/Tideflats Superfund  
Site

Dear Mr. Fuglevand:

The U. S. Environmental Protection Agency (EPA) hereby approves the Hylebos Cleanup Committee's (HCC) July 7, 1994 final Sampling and Analysis Plan (SAP) addendum for Event 1B for the Hylebos Waterway problem areas of the Commencement Bay Nearshore/ Tideflats (CB/NT) Superfund site, including replacement pages received by EPA on July 13, 1994. EPA finds that the SAP addendum is well written and meet the requirements of the November 29, 1993 Administrative Order on Consent (AOC) and Statement of Work (SOW).

The HCC is authorized to begin activities associated with Sampling Event 1B. As we agreed in our June 22, 1994 meeting, the HCC may combine the Sampling Event 1A and 1B data reports. The due date for the combined report will be April 3, 1995. The 1B technical memorandum is due to EPA 190 days after the date of this letter, on January 19, 1995.

Please distribute the final 1B SAP addendum pursuant to paragraph 60 of the AOC. Feel free to call me at 553-2140 if you have any questions.

Sincerely,

A handwritten signature in black ink, appearing to read "Allison Hiltner", is written over a horizontal line.

Allison Hiltner  
Remedial Project Manager

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## 1.0 INTRODUCTION

This document describes the sampling plan for the investigation of intertidal surface sediments in Hylebos Waterway (Sampling Event 1B of the Hylebos Waterway pre-remedial design program). In accordance with the requirements of the AOC/SOW (EPA 1993), the HCC is required to submit to EPA an addendum to the project SAP/QAPP (SEA et al. 1994) that describes the sampling locations for the intertidal sediment survey along with a justification for their selection.

## 2.0 OBJECTIVES

The objective of the intertidal sediment survey is to identify nearshore sediments (0' to +12' MLLW) which may require remediation, and sediments or anthropogenic materials which are or may have been sources of contamination to waterway sediments (DOF 1994).

The specific objectives of Event 1B include the following:

- Collect baseline chemical data on the intertidal sediments in the Hylebos Waterway
- Evaluate the physical nature of the bank sediments in the Hylebos Waterway
- Identify intertidal sediments which may require remediation
- Identify intertidal sediments or anthropogenic materials which are or may have been sources of contamination to waterway sediments
- Assess the potential for intertidal sediments to cause recontamination of the subtidal portions of the waterway following remediation.

To meet these objectives, composite sediment samples will be collected along the shoreline within established subareas which are based on similar sources and shoreline conditions. Additional samples will be collected from areas which contain suspected source materials. Collection of both composite and source material samples will provide data to support the requirements of the pre-remedial design Statement of Work, (EPA 1993) Section II.B.1.b.

### **3.0 SAMPLING PLAN**

This section provides an overview of the sampling and analysis portions of Event 1B. It includes a summary of the reconnaissance survey, selection of sample areas, sampling methods, sample types, and schedule. Background information and specific sampling information for each sampling area are contained in Appendix A.

#### **3.1 PLANNING FOR THE RECONNAISSANCE SURVEY**

Two criteria were identified in the EPA SOW for selecting sampling areas for Event 1B. These were 1) sediments are to be collected from the intertidal area defined as 0' to +12' MLLW, and 2) the material to be sampled may include anthropogenic materials in addition to sediment.

Candidate sampling areas were jointly identified by the HCC and EPA prior to the reconnaissance survey. The information used to select candidate areas included a review of aerial and ship based photographs, current land use, a review of existing sources, and a review of the Washington Department of Ecology (Ecology) Milestone 1 and 2 reports on source control efforts in the waterway.

#### **3.2 RECONNAISSANCE SURVEY**

The reconnaissance survey of the Hylebos Waterway was conducted on March 29-30, 1994. The HCC was represented by Paul Fuglevand (DOF), Peter Striplin and Cathy Barry (SEA). The EPA was represented by Allison Hiltner (EPA), Dena Hughes and Nancy Musgrove (Weston). The survey vessel was a 28 ft cruiser owned by Sanders and Associates and piloted by Cathy Barry of SEA. The survey was scheduled to view the shoreline starting on the ebb tide at +2 ft., survey through the low tide, and conclude at +2 ft. on the flood tide.

On March 29, the survey vessel departed the Chinook Marina (Puyallup Tribe Marina) and proceeded in an easterly direction along the northern shoreline to the upper turning basin, and back along the southern shoreline to Elf Atochem North America, Inc. On March 30, the survey started at the Elf Atochem dock and proceeded westerly along the southern shore of the waterway to AK-WA Shipbuilding.

During the reconnaissance survey, candidate areas were inspected and tentative sampling areas were identified based on the following additional information:

- A compilation of information on the bank sediments by Ecology
- The presence of anthropogenic material that may be a source of chemicals of concern
- The presence of outfalls, storm drains, pipes, and to a lesser extent seeps (see Section 3.3)
- The presence of sediment capable of being collected using a hand held sampling device
- Visual characterization of bank sediment (e.g., sediment grain size)
- Property boundaries.

### 3.3 SAMPLING LOCATIONS

Following the reconnaissance survey, the tentative sampling areas were reviewed and small adjustments were made to some of the areas to provide better coverage of the shoreline and to reflect additional source information. The presence of seeps was considered less useful for identifying potential sources of chemicals to the waterway than outfalls and drains because of the nature of seeps in the project area. Three types of seeps appear to exist in the Commencement Bay area. These include groundwater seeps, stormwater runoff seeps, and tidal seeps. Groundwater seeps are those that flow continuously due to groundwater discharge. Stormwater seeps are those that occur immediately following a storm event due to infiltration of stormwater which contacts an unsaturated impeding layer (i.e., silt or clay) and discharges from the waterway bank. Tidal seeps are those which occur at low tide because surface water from the waterway infiltrates into the bank during high tide and is stored within bank sediments until the tide recedes. Differentiating among these types of seeps is not possible without hydrological information. During the reconnaissance survey seeps were noted at approximately 70 percent of the tentative sampling areas. Since the reconnaissance survey was performed during low tide, it is expected that many of the observed seeps were tidal seeps.

The waterway was divided into the same five segments identified in the RI/FS and the Hylebos Waterway project SAP/QAPP (SEA et al., 1994). The segments are shown on Figures 1a-c.

A total of 77 sampling areas have been identified for the 1B sampling event. The sample areas, shoreline facilities, and an approximate shoreline frontage are presented in Table 1 and in Figures 1a-c.

Each sampling location is identified by a five digit alphanumeric label. The first digit is the segment number. The second digit refers to the survey. The next two digits represent the station number. The last digit refers to the sample type (i.e. intertidal = I).

The rationale for selection of each sampling area is presented in Appendix A. Information is presented from data reports, Washington Department of Ecology Milestone Reports, a compilation of information on the condition of the banks prepared by Ecology, the Hylebos Waterway Problem Area Status Report prepared for EPA by PRC Environmental Management, Urban Bay Action Team inspection reports, Ecology technical memorandums, and maps prepared by the Tacoma-Pierce County Health Department (TPCHD 1988) that show the locations of outfalls, seeps, drainage pipes and/or ditches. TPCHD discharge locations are shown on Figures 1a-c and listed in Table 2. Note that outfall numbers listed in Table 2 occasionally represent more than one outfall (e.g., outfall no. 83 represents six outfalls). In addition to the written justification, photographic plates for most sampling areas are also included in Appendix A. These photographs of the shoreline were taken during the reconnaissance survey.

### **3.4 SAMPLING METHODS**

The methods presented below describe sampling logistics and the methods for obtaining composite samples collected from randomly distributed locations within each sampling area. Further details of the sampling methodology for Event 1B can be found in the project SAP/QAPP in Section 6.4.3.4. Safety requirements to be followed during the 1B field sampling event are found in the project Health and Safety Plan (HSP) which is appended to the project SAP/QAPP. A discussion of physical safety when working under piers is found in Section 4.3 of the HSP and the associated errata page.

#### **3.4.1 Logistics**

Intertidal sediments will be collected by three field crews. Two crews will use small boats to run from the sample processing station to the sampling areas. The RV Kittiwake will be used as the sample processing station. The third field crew will be shore based and will collect samples from areas easily accessible by van. This crew will carry three sets of decontaminated sample handling equipment and will process up to three samples in the van. They will then return to the 1A core processing laboratory to decontaminate their sample handling equipment. A fourth crew will work on board the RV Kittiwake where they will decontaminate sample collection and handling equipment, and composite, homogenize, and distribute the sediment into the various containers for laboratory analysis. The sample collecting crews operating from the small boats and the van will prepare the samples slated for volatile organics and total sulfide analyses. Decontamination procedures for all field sampling equipment will follow the procedures outlined in Section 6.4.2 of the project SAP/QAPP.

### 3.4.2 Rationale and Approach for Obtaining Sample Composites

A stratified random sample compositing approach will be applied to nearly 90 percent of the sampling areas during Event 1B. Each of these samples sent for laboratory analysis will be a composite of between four and ten field samples collected randomly within the sampling area. The resulting data will represent average conditions over the sampling area. This approach will enable the characterization of most of the waterway whereas a point sample approach would only characterize small portions of the waterway. The HCC and the EPA have identified eight sampling areas that may contain source materials and have dedicated a source material sample for each area. These sampling areas include:

- Occidental Chemical Corporation
- PRI Northwest, Inc.
- Buffelen Woodworking Company
- Murry Pacific Corporation
- Donald Oline
- USG Interiors
- Elf Atochem North America, Inc.
- Louisiana Pacific Corporation

The eight source material sample collection locations will be coordinated between the HCC field crew and EPA oversight personnel. A representative sample of the source material will be composited at each location.

Tentative sampling areas identified during the reconnaissance survey represent a wide variety of physical environments and sample composite distances. These include various shoreline types (i.e., broad mud flats, steep embankments, and anthropogenic materials), areas near outfalls, and seeps. Most samples for compositing will be collected along a transect line established between the 0' to +4' MLLW tidal elevations to capture the influence of sources higher on the bank on sediment in the waterway.

Table 3 presents the compositing scheme to be used to sample each area. In sampling areas with shoreline distances of less than or equal to 50 ft., cores will be composited from two randomly selected locations. In sampling areas between 50 and 500 ft., cores will be composited from one randomly selected location per each 50 ft. section of the sampling area. In sampling areas with shoreline distances between 500 and 750 ft., cores will be composited from one randomly selected location per each 75 ft. section of the sampling area. In sampling areas greater than 750 ft., cores will be composited from one randomly selected location per each 100 ft. section of the sampling area.

Sampling locations for each sampling area are found in Appendix A. Distances along the sampling transect were determined using the random number generator on a HP 48G calculator.

### 3.4.3 Approach for Collecting Samples

Sampling will be accomplished by collecting samples at random locations within predetermined shoreline length intervals along one horizontal transect. Each sampling crew will use the plates provided in Appendix A, which also contain preselected randomly generated sampling locations, to determine where to collect sediment. The person collecting samples will begin at one end of the sampling area and will move to the first sampling location indicated on the plate. Shoreline distance will be measured using a hip chain. When the sampler has reached the sampling location, they will remove the top 10 cm of sediment using a hand held calibrated stainless steel coring device and will place the sediment into a stainless steel bowl. The sampler will cover the bowl with aluminum foil or a stainless steel cover, complete the field log (hip chain distance, core penetration depth, sediment characteristics, significant anthropogenic materials not noted during the reconnaissance survey) move to the next core sampling location, and collect another sample. This process will be repeated until the full length of the transect has been covered.

If a 10 cm sample can not be obtained from a selected sampling point due to obstructions, the sampler will attempt to obtain sediment within ten feet of the original point ( $\pm 10$  ft). If a sample can not be obtained within ten feet of the original point, the sampler will attempt to obtain a sample at successive ten foot intervals until the entire segment has been covered. If 10 cm can not be obtained anywhere within the segment then the sample will be collected at the location with the deepest penetration and the penetration depth will be noted in the field log.

The sampling device will be a hand held stainless steel coring device four inches in diameter by 8 inches in length, with an attached "T" handle for advancing the tube. The coring device is scored at 1.0 cm intervals from the end.

## 3.5 SAMPLE TYPES

One composite field sample will be collected within each of the identified sampling areas. At three stations, two blind field replicates for chemical analysis will be collected. Blind field replicates are additional samples collected in a sampling area at a new set of randomly established locations along the same transect as the original field sample. These data will be used to determine the natural variability associated with the sampling area and sample handling and laboratory operations.



Blind field sample splits will also be generated in the same sampling areas as the blind field replicates. These samples will be taken from the same composite sample as the field sample. The resulting data will provide information on the variability associated with sample handling and laboratory analysis operations.

The sampling areas at which the blind field replicates and blind field sample splits will be collected will include one with an outfall or drain pipe (Sampling area 1201I), one that is a mud flat (Sampling area 3201I), and one that is a sand flat (Sampling area 4208I).

Sediment samples will be analyzed for the same classes of chemical compounds and using the methods as provided in Sections 7.1.2 and Tables 6 and 15 of the project SAP/QAPP (SEA et al. 1994).

Analysis of tributyltin (TBT) will occur at 15 sampling areas that encompass past or present marinas, boat repair, and boat construction facilities (Table 4).

The total estimated number of samples for analysis, including blind field replicates and blind field splits is shown in Table 5.

### 3.6 SAMPLING SCHEDULE

Sampling for Event 1B will commence after EPA approval of the 1B SAP addendum, pending gaining property access from property owners and the appropriateness of the tides (Figure 2). Sampling is anticipated to take a minimum of 10 days. The order in which sample areas will be occupied will depend to a large extent on whether ships, barges, log rafts, log booms, or other obstructions are blocking the sampling area. Owners/operators will be contacted prior to the initiation of sampling to facilitate relocation or removal of obstructions. Other considerations for the order of sampling are sampling elevation and tidal cycle.

Sampling will be targeted for days when the lowest tide is lower than approximately -1.0' MLLW and will be conducted during daylight hours when tides are lower than +2' MLLW. These daylight tidal conditions will occur July 18-24, August 5-7, and August 17-19. Suitable tides for sampling do not occur in September, and the required low tides occur only at night in October and November. Nighttime sampling is not under consideration due to a variety of worker safety issues relating to nighttime boat and shoreline operations.

Sampling will take at least ten field days to complete. If SAP approval by EPA is not received by July 11, 1994, Sampling Event 1B may not be completed according to the

schedule set forth in the AOC/SOW and project SAP/QAPP because of insufficient days with suitable daylight low tides.

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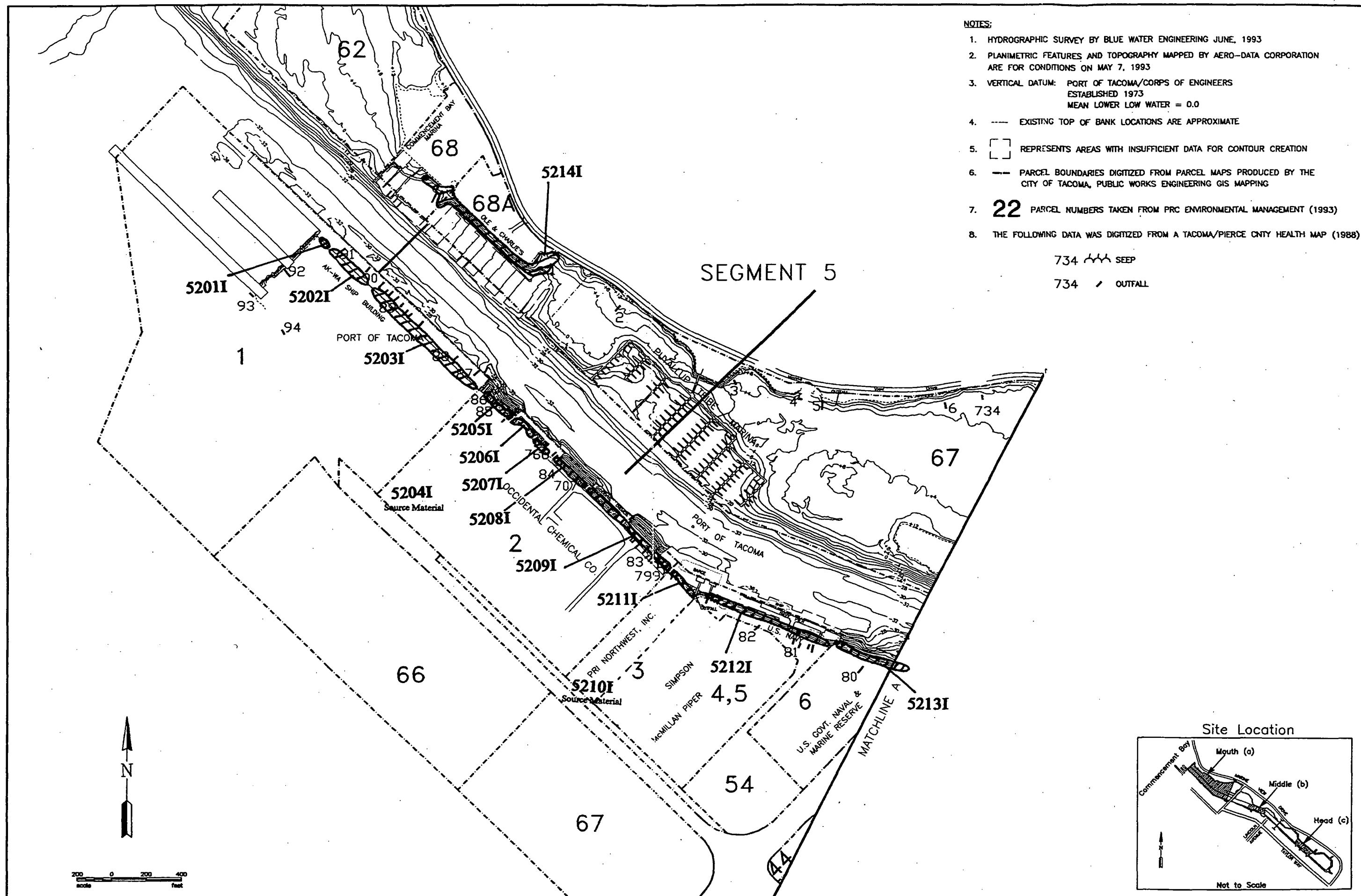
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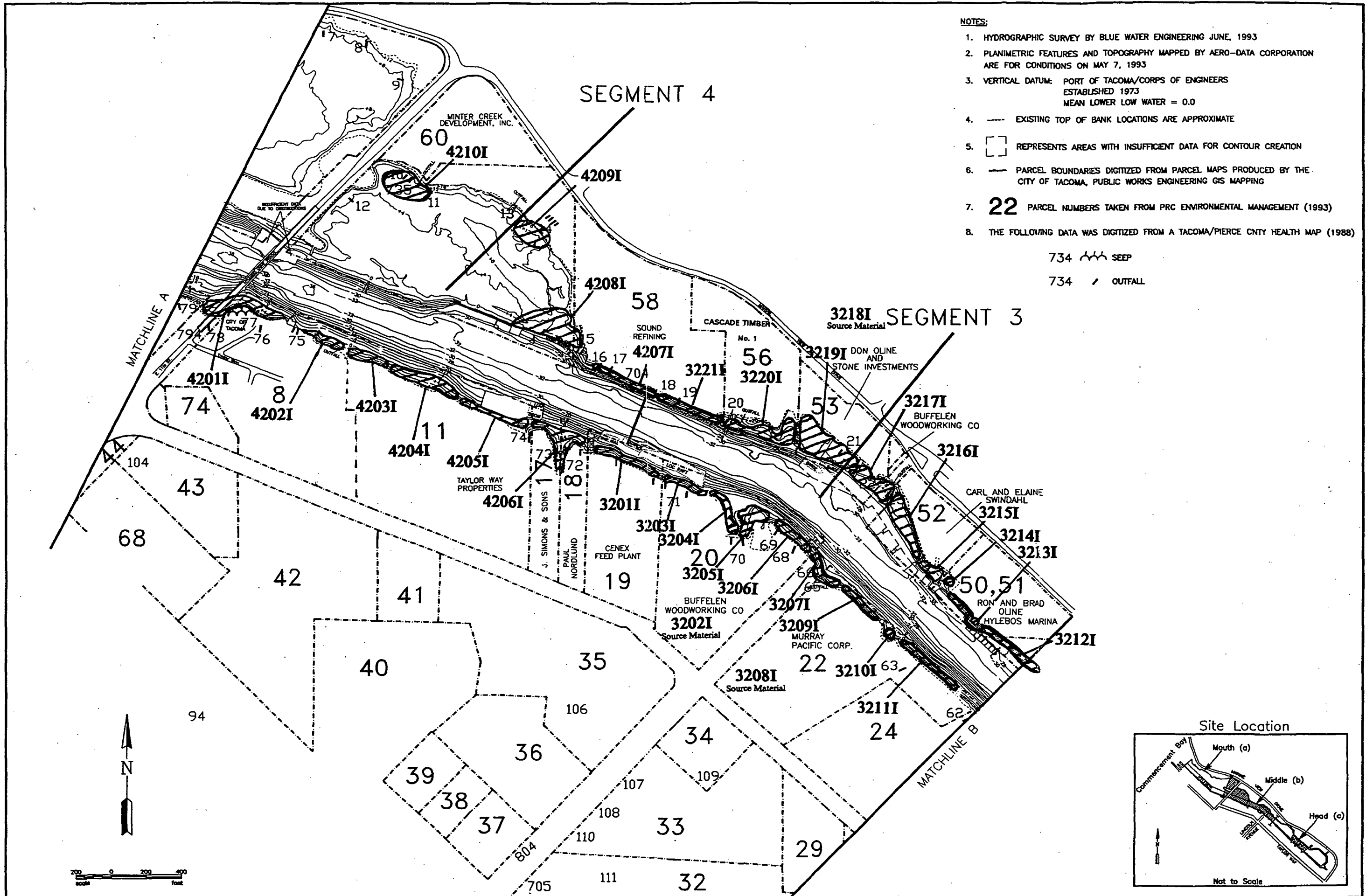
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DRAWING: HYSET1R1 DATE: 8/17/94

Figure 1b.  
Sampling areas for Event 1B at the middle of the Hylebos Waterway.



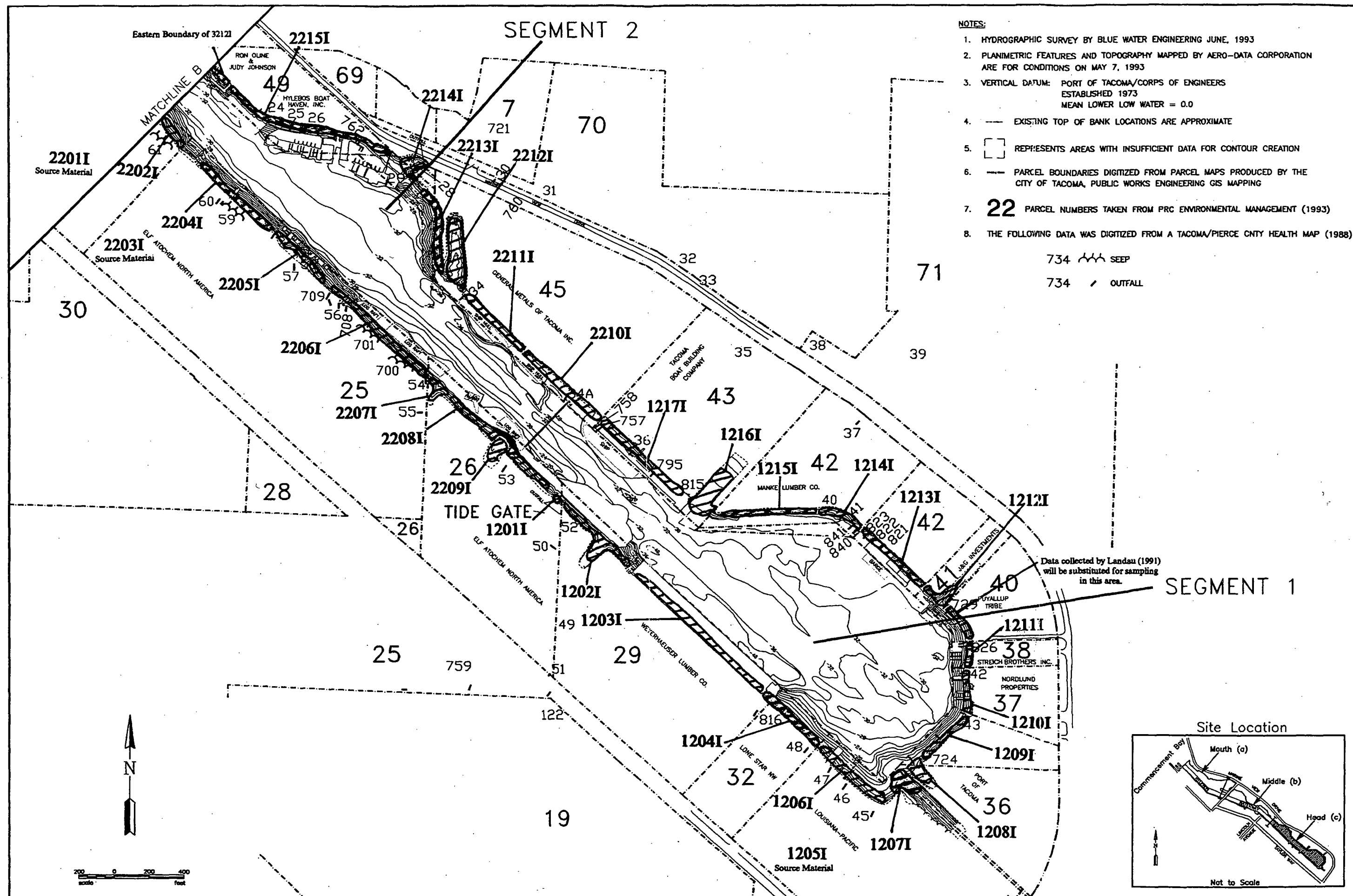


Figure 1c.  
Sampling areas for Event 1B at the  
head of the Hylebos Waterway.

Figure 2. Schedule for Event 1B intertidal sediment sampling.

ID	Name	Duration	1994												1995						
			Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul					
1	Approval of SAP Addendum	0d		◆ 7/11																	
2	Field mobilization	2d		7/15																	
3	Field Event 1	7d		■ 7/24																	
4	Field Event 2	3d		8/7																	
5																					
6	Analytical Services	45d		■ 9/2																	
7																					
8	Data Validation	60d					■ 10/31														
9																					
10	Prepare Tech Memo	45d						■ 12/4													
11	Tech Memo to EPA	0d									◆ 1/5										
12																					
13	Prepare 1B Report	120d									■ 4/2										
14	1B Report to EPA	0d										◆ 4/3									

**QUESTIONS**



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Table 1. Sample locations for Event 1B.

Plate	Sample	Shoreline Facilities	Shoreline length (ft.) <sup>1</sup>	Pathway <sup>2</sup>	Milestone 1 Report <sup>3</sup>			Milestone 2 Report <sup>4</sup>
					List 1	List 2	List 3	
1	5201I	AK-WA Shipbuilding (Tip of Dock)	50	R, PS	•	•	•	
2	5202I	AK-WA Shipbuilding	300					
3	5203I	Port Industrial Yard	800	R, PS	•	•	•	
4	5204I	Occidental Chemical Corporation (Source Material)	TBD	GW, SS	•	•	•	•
5	5205I	Occidental Chemical Corporation	200	GW, SS	•	•	•	•
6	5206I	Occidental Chemical Corporation	150	GW, SS	•	•	•	•
7	5207I	Occidental Chemical Corporation	100	GW, SS	•	•	•	•
8	5208I	Occidental Chemical Corporation	245	GW, SS	•	•	•	•
9	5209I	Occidental Chemical Corporation	650	GW, SS	•	•	•	•
10	5210I	PRI Northwest, Inc. (Source Material)	TBD	GW, SS	•	•	•	
11	5211I	PRI Northwest, Inc.	175	GW, SS	•	•	•	
12	5212I	USN Dock / CMX Trucking	750	R, GW	•	•	•	
13	5213I	USN & USMC Reserve Cntr	425	R	•			
14	5214I	Ole & Charlie's Marina	875	R, GW	•	•	•	
15	4201I	City of Tacoma-Steam Plant	425	U	•			
16	4202I	City of Tacoma-Steam Plant	275	U	•			
17	4203I	Taylor Way Properties, Inc.	250	GW, R, SS	•	•	•	

Plate	Sample	Shoreline Facilities	Shoreline length (ft.) <sup>1</sup>	Pathway <sup>2</sup>	Milestone 1 Report <sup>3</sup>			Milestone 2 Report <sup>4</sup>
					List 1	List 2	List 3	
18	4204I	Taylor Way Properties, Inc.	425	GW, R, SS	•	•	•	
19	4205I	Taylor Way Properties, Inc.	400	GW, R, SS	•	•	•	
20	4206I	Simon and Sons, Inc.	300	R, SS	•	•	•	
21	4207I	Sound Refining Co. (Bulkhead)	400	PS, R	•	•	•	
22	4208I	Sound Refining Inc. (Beach)	400	PS, R	•	•	•	
23	4209I	Sound Refining Inc. (Parking Lot)	220	PS, R	•	•	•	
24	4210I	Bay Chemical / Banyon Rail	250	PS, R	•	•	•	
25	3201I	Cenex Agriculture, Inc.	350	U				
26	3202I	Buffelen Woodworking Co (Source Material)	TBD	GW, SS	•	•	•	
27	3203I	Buffelen Woodworking Company	350	GW, SS	•	•	•	
28	3204I	Buffelen Woodworking Company	300	GW, SS	•	•	•	
29	3205I	Buffelen Woodworking Company	300	GW, SS	•	•	•	
30	3206I	Buffelen Woodworking Company	225	GW, R	•	•	•	
31	3207I	Lincoln Street Drain	140					
32	3208I	Murray Pacific Corp. (Source Material)						
33	3209I	Murray Pacific Corp. (Log Yard 1)	380	R	•	•	•	
34	3210I	Murray Pacific Corp. (Log Ramp)	100	R	•	•	•	
35	3211I	Murray Pacific Corp. (Log Yard 1)	375	R	•	•	•	
36	3212I	Hylebos Marina	690	GW	•	•	•	

Plate	Sample	Shoreline Facilities	Shoreline length (ft.) <sup>1</sup>	Pathway <sup>2</sup>	Milestone 1 Report <sup>3</sup>			Milestone 2 Report <sup>4</sup>
					List 1	List 2	List 3	
37	3213I	Hylebos Marina (Under Barge)	25	GW	•	•	•	
38	3214I	Mather Auctioneers	25	R, SS	•	•	•	
39	3215I	Modutech Marine	145	R	•	•	•	
40	3216I	Modutech Marine	375	R, SS	•	•	•	
41	3217I	Modutech Marine/Oline, Donald	300	R, SS	•	•	•	
42	3218I	Oline, Donald (Source Material)	TBD	R, SS	•	•	•	
43	3219I	Oline, Donald	350	R, SS	•	•	•	
44	3220I	Cascade Timber Company Yard # 1	400	R	•	•	•	
45	3221I	Sound Refining Inc. (Bulkhead)	430	PS, R	•	•	•	
46	2201I	USG Interiors (Source Material)	TBD	GW	•	•	•	
47	2202I	USG Interiors	200	GW	•	•	•	
48	2203I	Elf Atochem North America (Source Material)	TBD	GW, R	•	•	•	•
49	2204I	Elf Atochem North America (Main Facility)	500	GW, R	•	•	•	•
50	2205I	Elf Atochem North America (Main Facility)	400	GW, R	•	•	•	•
51	2206I	Elf Atochem North America (Main Facility)	740	GW, R	•	•	•	•
52	2207I	East Channel Ditch	105	GW, R	•	•	•	•
53	2208I	Elf Atochem North America (Dunlap Towing Company)	825	R	•	•	•	•
54	2209I	Elf Atochem North America (Dunlap Towing Company Log Ramp)	100	R	•	•	•	•
55	2210I	General Metals of Tacoma, Inc. (Dock)	570	R	•	•	•	•

Plate	Sample	Shoreline Facilities	Shoreline length (ft.) <sup>1</sup>	Pathway <sup>2</sup>	Milestone 1 Report <sup>3</sup>			Milestone 2 Report <sup>4</sup>
					List 1	List 2	List 3	
56	2211I	General Metals of Tacoma, Inc. (Dock)	475	R	•	•	•	•
57	2212I	General Metals of Tacoma, Inc. (Graving Slip)	400	R	•	•	•	•
58	2213I	General Metals of Tacoma, Inc. (Beach)	400	R	•	•	•	•
59	2214I	Morningside Ditch	175	R	•	•		
60	2215I	Hylebos Marina	1060	GW	•	•	•	
61	1201I	Kaiser Ditch	20	SS	•	•	•	•
62	1202I	Weyerhaeuser Company (Log ramp)	525	U	•	•		
63	1203I	Weyerhaeuser Company (Dock)	975	U	•	•		
64	1204I	Lone Star Industries	440	U	•	•		
65	1205I	Louisiana Pacific Corp. (Source Material)	TBD	R	•	•	•	•
66	1206I	Louisiana Pacific Corp.	500	R	•	•	•	•
67	1207I	Hylebos Creek	100	U	•	•	•	
68	1208I	Wasser-Winters Ramp	80	R	•	•	•	•
69	1209I	Wasser-Winters	375	R	•	•	•	•
70	1210I	Nordlund BoatBuilding Co.	240	R	•	•	•	
71	1211I	Streich Brothers	125	U				
72	1212I	Jones-Goodell Corporation	160	R	•	•	•	
73	1213I	Manke Lumber Company, Inc. (Lumber Yard)	480	U	•	•		
74	1214I	Manke Lumber Company, Inc. (Log Yard)	200	U	•	•		
75	1215I	Manke Lumber Company, Inc. (Log Yard)	525	U	•	•		

Plate	Sample	Shoreline Facilities	Shoreline length (ft.) <sup>1</sup>	Pathway <sup>2</sup>	Milestone 1 Report <sup>3</sup>			Milestone 2 Report <sup>4</sup>
					List 1	List 2	List 3	
76	1216I	Tacoma Boatbuilding Co., Inc. (Boat Ramp)	200	R	•	•	•	•
77	1217I	Tacoma Boatbuilding Co., Inc.	630	R	•	•	•	•

<sup>1</sup> TBD = Sample TO BE DECIDED at the time of sampling

<sup>2</sup> Pathway = The route by which problem chemicals may enter the Hylebos Waterway based on Ecology's Milestone 1 reports.

R - Stormwater runoff  
SS - Shoreline sediments  
PS - Point source discharge  
GW - Groundwater  
U - Unknown

<sup>3</sup> Washington Department of Ecology Milestone 1 source control report to EPA . **Ongoing Confirmed Sources Identified:** Milestone 1 is achieved when all confirmed ongoing sources of problem chemicals are identified, and lists 1,2,and 3 have been completed.

List 1 - Potential Sources

List 2 - Probable Sources

List 3 - Confirmed Sources

<sup>4</sup> Washington Department of Ecology Milestone 2 source control report to EPA. **Essential Administrative Actions in Place for Major Sources:** Milestone 2 is achieved when all essential administrative actions (i.e., permits, orders, decrees) are in place for major sources of problem chemicals.

Table 2. List of outfalls in the Commencement Bay Tidelands Area (TPCHD 1988).

IDENTIFICATION OF NUMERICAL SYMBOLS TO ACCOMPANY MAP OF STORM DRAINAGE IN THE COMMENCEMENT BAY TIDEFLATS AREA TACOMA, WASHINGTON JULY 1, 1988											
TACOMA - PIERCE COUNTY HEALTH DEPARTMENT & WASHINGTON STATE DEPARTMENT OF ECOLOGY											
MAP #	INTERVIEW	ELEVATION	DESCRIPTION	MAP #	INTERVIEW	ELEVATION	DESCRIPTION	MAP #	INTERVIEW	ELEVATION	DESCRIPTION
1	Yulee	10.4	12" & 14" concrete pipe outfalls	42	Yulee	10.6	12" steel pipe outfall	174	Sitcom	999.0	CS with PVC pipe riser (detail available)
2	Yulee	999.0	14" steel pipe outfall	43	Yulee		14" concrete pipe outfall (not in use)	175	Sitcom	3.4	24" concrete pipe outfall, basin w/tidegate
3	Yulee	8.7	8" iron pipe outfall	44	Yulee		4" steel pipe outfall (no longer in use)	176	Sitcom	5.5	10" concrete pipe outfall
4	Yulee		brick and rock bed outfall underground	45	Yulee	13.7	12" steel pipe from bulkhead (not in use)	180	Milwaukee	13.0	6" iron pipe outfall
5	Yulee	10.1	48" concrete pipe outfall with basin	46	Yulee	9.2	10" pipe outfall (no longer in use)	181	Puyallup		12" conc. pipe outfall (plugged, not in use)
6	Yulee	9.1	12" concrete pipe outfall	47	Yulee	9.7	8" steel pipe outfall	182	Puyallup	4.5	12" concrete pipe with tidegate outfall
7	Yulee	11.5	12" concrete pipe outfall	48	Yulee		12" pipe outfall	184	Blair	999.0	oilwater and ditch system (detail available)
8	Yulee	9.8	12" concrete pipe outfall	49	Yulee		eight pipes (3 - 8" and 4 - 6")	185	Blair	999.0	four 12" corrugated steel pipes into ditch
9	Yulee	9.1	48" wide ditch outfall	50	Yulee		1.5" steel pipe	186	Puyallup		12" iron pipe in concrete basin
10	Yulee		12" steel pipe outfall	51	Yulee		4" pipe outfall	187	Blair	999.0	collection and distribution struct. (det. av.)
11	Yulee	7.0	18" concrete pipe outfall	52	Yulee		4" pipe outfall	188	Blair	999.0	24" pipe into ditch
12	Yulee		12" concrete pipe outfall	53	Yulee		4" pipe outfall	189	St. Paul	999.0	Allegan Thomas Kraft Company main outfall
13	Yulee	7.4	10" concrete pipe outfall	54	Yulee		4" pipe outfall	190	Puyallup		4" steel pipe outfall
14	Yulee	999.0	four 12" corrugated steel pipe outfalls	55	Blair		12" pipe (detail drawing available)	191	Puyallup		12" concrete pipe outfall
15	Yulee	13.4	2 steel pipes (6" & 12") outfalls	56	Blair		eight pipes (detail drawing available)	192	Puyallup		12" corrugated steel pipe outfall
16	Yulee		6" steel pipe outfall and water flow	57	Blair		6" wide open channel outfall	193	Puyallup	1.0	concrete basin and tide gate outfall
17	Yulee		12" corrugated steel pipe outfall	58	Blair	9.3	two pipes (4" PVC, 4" steel) outfalls	194	Puyallup		seep on river bank
18	Yulee		4" iron and 8" steel pipe outfalls	59	Blair	9.8	12" concrete pipe outfall	195	Puyallup		two 30" concrete pipe outfalls (POW)
19	Yulee	6.9	24" corrugated steel pipe outfalls	60	Blair	13.0	12" concrete pipe outfall	196	Puyallup		Cleveland Way Pump Station and outfall
20	Yulee	5.4	14" concrete pipe outfall	61	Blair	11.5	12" PVC pipe outfall	197	Puyallup		12" concrete pipe outfall
21	Yulee	7.4	30" concrete pipe outfall	62	Blair		6" steel pipe outfall	198	Puyallup	999.0	two 30" corrugated steel pipes in pond
22	Yulee		12" wide ditch outfall	63	Blair	-1.7	72" corrugated steel pipe outfall	199	Middle		seep
23	Yulee	8.3	18" concrete pipe outfall	64	Blair	999.0	seep and catch basin system	200	Middle		27" concrete pipe outfall
24	Yulee		seep along bank	65	Blair	999.0	pump station and marsh area	201	Middle		4" PVC pipe outfall
25	Yulee		12" concrete pipe outfall	66	Blair	999.0	12" corrugated steel pipe outfall	202	Middle	999.0	1.5" iron pipe into city storm catch basin
26	Yulee		4" PVC and 12" concrete pipe outfalls	67	Blair	999.0	4" PVC	203	Middle	999.0	catchbasin with inlet pipes (det. avail.)
27	Yulee	999.0	6" iron pipe outfall	68	Blair	999.0	two pipes (3" & 4" PVC) to open ditch drain	204	Middle	999.0	4" steel pipe outfall
28	Yulee	6.6	48" corrugated steel pipe outfall	69	Blair	999.0	6" steel pipe	205	Middle	999.0	two 6" PVC pipes into CS (det. avail.)
29	Yulee		48" old concrete pipe with steel flange	70	Blair	999.0	open channel ditch	206	City		4" iron pipe outfall
30	Yulee	999.0	bank seep and 4" ABS pipe into ditch	71	Blair	11.3	floatation pond & 5 pipes (3x10" st. 2x12" PVC)	207	City	7.7	12" concrete pipe outfall
31	Yulee	999.0	pond	72	Blair	12.5	ditch outfall into waterway	208	City	6.4	15" concrete pipe outfall
32	Yulee	999.0	concrete box with 12" pipe	73	Blair	10.7	three pipes (6" steel, 2x12" steel) outfalls	209	City		10" corrugated steel pipe (insoperative sys.)
33	Yulee	999.0	12" ABS & 36" corrugated steel pipe outfalls	74	Blair	11.6	6" concrete and 4" steel pipe outfalls	210	City		4" steel pipe outfall
34	Yulee		three 12" corrugated steel pipe outfalls	75	Blair		12" concrete pipe outfall	211	City	999.0	1.5" iron pipe into street
35	Yulee	999.0	34" wide ditch	76	Blair	12.8	12" steel pipe outfall	212	City	9.0	two 6" st. pipes w/bulk off plates & 4" conc.
36	Yulee	10.0	12" concrete pipe outfall	77	Blair	12.6	12" steel pipe outfall	213	City	8.9	12" concrete pipe outfall
37	Yulee	999.0	2" iron pipe into ditch	78	Blair	11.5	18" corrugated steel pipe outfall	214	City	8.5	10" steel pipe outfall
38	Yulee	999.0	manhole	79	Blair	2.0	60" corrugated steel pipe	215	City	12.2	4" steel pipe outfall
39	Yulee	999.0	settling basin	80	Blair	999.0	ditch system	216	City	10.3	10" steel pipe outfall with tide gate
40	Yulee		12" concrete pipe outfall	81	Yulee	999.0	closed storm system (Kaiser Aluminum)	217	City	10.0	12" concrete pipe outfall
41	Yulee		two 8" concrete pipe outfalls	82	Blair	999.0	open ditch system	218	City	9.4	12" concrete & three steel pipes
42	Yulee	8.7	12" iron pipe outfall	83	Blair		Wapato ditch (72" corr. st., 12" 2x12" steel)	219	City		16" iron pipe outfall
43	Yulee	8.7	two 4" ABS, one 12" PVC pipe outfalls	84	Blair		four pipes (6" PVC, 12" 12" corr. st., 12" conc.)	220	City	1.2	24" steel pipe outfall (320' W of this point)
44	Yulee	999.0	16" pipe outfall into Yulee Creek	85	Blair		three pipes (18" conc., 4" PVC, 8" 12" PVC)	221	City	6.0	10" steel pipe outfall
45	Yulee		34" wide ditch outfall	86	Blair	999.0	12" corrugated steel pipe outfall	222	City	9.9	4" PVC pipe outfall
46	Yulee	11.3	12" concrete pipe outfall	87	Blair		two 8" corrugated steel pipe outfalls	223	City		two iron pipe outfalls w/possible third.
47	Yulee	11.0	12" corrugated steel pipe outfall	88	Blair	999.0	three 12" corrugated steel pipe outfalls	224	City	4.0	30" concrete pipe and basin outfall
48	Yulee		12" concrete pipe outfall	89	Blair	0.0	48" concrete pipe outfall w/tidegate	225	City	8.4	6" & 3" steel pipe outfalls
49	Yulee		settling tank overflow into Kaiser Ditch	90	Blair	9.0	12" corrugated steel pipe outfall	226	City	9.4	5" concrete and 3" PVC pipe outfalls
50	Yulee		12" corrugated steel pipe outfall	91	Blair	0.5	12" corrugated steel pipe outfall	227	City	5.3	six pipes from old steam plant
51	Yulee	999.0	pipe into ditch from log yard	92	Blair	12.9	4" steel pressure pipe feeding boom	228	City	12.9	1.5" PVC pipe outfall (under warehouse)
52	Yulee	2.3	48" concrete pipe outfall with tidegate	93	Blair	9.0	7 steel pipe subdrains (6" to 12" diameter)	229	City	2.8	48" concrete pipe with basin outfall
53	Yulee		outfall in rock on waterway bank	94	Blair	3.3	48" concrete pipe with tidegate	230	City	999.0	bulkhead overflow orifice
54	Yulee		east ditch outfall	95	Blair		8 steel pipe subdrains (6" to 12" diam.)	231	City		outfalls from NW Plywood (insoperative pipes)
55	Yulee		8" PVC pipe to east ditch (capped)	96	Blair	12.6	14" concrete pipe (seepage overflow) outfall	232	City	12.5	6" concrete pipe outfall
56	Yulee		concrete pipe outfall	97	Blair	999.0	Catch basin and closed storm system	233	City	5.0	48" concrete pipe with basin outfall
57	Yulee		three steel pipe outfalls	98	Blair	999.0	12" concrete pipe into ditch	234	City	999.0	6" steel pipe outfall
58	Yulee		four pipes (36" & 12" steel, two 1.5" iron)	99	Blair	999.0	18" steel pipe outfall from Buffer Dam	235	City	6.8	twice 36" concrete pipe storm system outfalls
59	Yulee		seeps along bank	100	Blair	999.0	4" PVC pipe outfall into ditch	236	City	1.5	seep into waterway
60	Yulee	10.5	12" corrugated steel pipe outfall	101	Blair	999.0	12" concrete pipe into ditch	237	City	9.1	12" iron pipe outfall
61	Yulee		seeps along bank	102	Blair	999.0	12" concrete pipe into ditch	238	City	7.7	8" steel pipe outfall
62	Yulee	7.5	12" concrete pipe outfall	103	Blair		4" PVC pipe outfall	239	City	8.1	12" steel pipe outfall
63	Yulee		18" corrugated steel pipe outfall	104	Blair		seeps from multileveled waterway bank	240	City	8.6	6" concrete pipe outfall
64	Yulee		4" steel pipe outfall	105	Blair	10.3	8" steel pipe outfall	241	City	0.0	21" corrugated steel pipe outfall
65	Yulee	10.5	two pipes (12" corrugated steel and 4" steel)	106	Blair	7.2	18" corrugated steel pipe outfall	242	City	999.0	6" concrete pipe outfall
66	Yulee	1.2	34" concrete pipe outfall	107	Blair		pipe outfalls from concrete Tech (det. av.)	243	City		18" concrete pipe outfall
67	Yulee		4" steel pipe outfall	108	Blair		four 6" steel pipe outfalls	244	City		two 4" PVC pipe outfalls (restaurant drains)
68	Yulee	9.0	4" steel pipe outfall	109	Blair	7.6	18" concrete pipe outfall	245	City	12.5	18" concrete pipe outfall
69	Yulee		4" steel pipe and flow over bulkhead	110	Blair	10.9	24" concrete pipe outfall w/basin	246	City		18" concrete pipe outfall
70	Yulee	9.2	two pipes (3" st. 4" PVC) and ditch	111	Blair	10.6	30" concrete pipe outfall	247	City	6.0	30" concrete pipe outfall
71	Yulee		four pipes (12", 1", 2" steel, 4" green PVC)	112	Blair	6.9	24" pipe with basin	248	City		18" wide open channel outfall
72	Yulee	5.5	open channel outfall	113	Blair		24" concrete pipe outfall with basin	249	City	999.0	24" concrete pipe outfall
73	Yulee		16" wide ditch outfall	114	Blair		4" steel pipe outfall with seep system	250	City	999.0	6" PVC pipe outfall
74	Yulee	12.2	two pipes (4" PVC, 4" steel) outfalls	115	Sitcom	6.7	18" concrete pipe in basin	251	City		4" concrete pipe outfall
75	Yulee		30" concrete pipe outfall	116	St. Paul		24" concrete pipe outfall (behind pierhead)	252	City	4.0	30" concrete pipe outfall
76	Yulee		seep from bank	117	St. Paul		36" concrete pipe (behind pierhead)	253	City	7.9	6" pvc and 12" concrete pipe outfalls
77	Yulee	12.5	12" concrete pipe	118	Sitcom	999.0	12" concrete pipe (behind pierhead)	254	City	8.0	three pipes (6" concrete, two 4" iron) outfalls
78	Yulee	8.9	18" steel pipe outfall	119	Sitcom	999.0	pipe outfall (behind pierhead)	255	City	8.0	five to ten abandoned iron pipes from bldg.
79	Yulee	4.5	4" steel pipe outfall	120	Sitcom		60" concrete pipe outfall	256	City	8.0	6" concrete pipe outfall
80	Yulee	6.5	four pipes (18" concrete, 18", 22x4" steel)	121	Sitcom	999.0	ditch and CS's to storm system	257	City	8.0	12" steel pipe outfall
81	Yulee							258	City	999.0	12" PVC pipe outfall
82	Yulee							259	City		
83	Yulee							260	City		
84	Yulee							261	City		
85	Yulee							262	City		
86	Yulee							263	City		
87	Yulee							264	City		
88	Yulee							265	City		
89	Yulee							266	City		
90	Yulee							267	City		
91	Yulee							268	City		
92	Yulee							269	City		
93	Yulee							270	City		
94	Yulee							271	City		
95	Yulee							272	City		
96	Yulee							273	City		
97	Yulee							274	City		
98	Yulee							275	City		
99	Yulee							276	City		
100	Yulee							277	City		
101	Yulee							278	City		
102	Yulee							279	City		
103	Yulee							280	City		
104	Yulee							281	City		
105	Yulee							282	City		
106	Yulee							283	City		
107	Yulee							284	City		
108	Yulee							285	City		
109	Yulee							286	City		
110	Yulee							287	City		
111	Yulee							288	City		
112	Yulee							289	City		
113	Yulee							290	City		
114	Yulee							291	City		
115	Yulee							292	City		
116	Yulee							293	City		
117	Yulee							294	City		
118	Yulee							295	City		
119	Yulee							296	City		
120	Yulee							297	City		
121	Yulee							298	City		
122	Yulee							299	City		
123	Yulee							300	City		
124	Yulee							301	City		
125	Yulee							302	City		



Table 3. Sample compositing scheme for various shoreline lengths in Hylebos Waterway.

Shoreline Distance (ft)	Compositing Strategy	No. Cores/ Point <sup>1</sup>
≤ 50	Composites from two points distributed randomly	2
> 50 - ≤500	Composites randomly chosen from one point per every 50 ft	≤150' : 2 > 150' : 1
> 500 - ≤750	Composites randomly chosen from one point per every 75 ft	1
> 750	Composites randomly chosen from one point per every 100 ft	1

<sup>1</sup> The volume of the core sampling device is about one quart, and three quarts of sediment are needed for chemical analysis. A minimum of four core samples will be collected from each sampling area.

Table 4. Sample areas identified for analysis of tributyltin.

Sample Area	Property Number <sup>1</sup>	Past or Present Occupants Involved in Ship Building, Ship Repair, or Marina Operation <sup>2</sup>
5201I 5202I	1	AK-WA Shipbuilding/ Port Industrial Yard Seattle-Tacoma Shipbuilding Corporation Todd Drydock & Construction Corporation U.S. Navy
5213I	5	Tacoma Boatbuilding Company, Inc.
4206I	18	Nordlund Boatbuilding Co.
4205I	11	Hylebos Boat Haven
3212I 3209I	52 49	Modutech Marine, Inc., Martinolich Ship Building Hylebos Marina
2211I	49	Hylebos Marina, Aquila Sailboats, CLK Yacht Crafters, Yacht Doctors, Knapp Boat Building Co.
2208I	45	General Metals of Tacoma (Graving Slip)
1217I 1216I	43	Tacoma Boatbuilding Company, Inc. Tacoma Boatbuilding Co. Boat Ramp
1213I	42	Nordlund Boat Company, Inc.
1212I	41	Jones Goodell Shipbuilding
1211I	38	Streich Bothers
1210I	37	Nordlund Boat Company, Inc.

<sup>1</sup> Property numbers taken from Figure 1 in PRC Environmental Management (1993).

<sup>2</sup> Source of information is PRC Environmental Management (1993).

Table 5. Summary of estimated numbers of field and QC samples. <sup>1</sup>

Parameter	Field Samples			QC Samples					Estimated Total No. of Analyses
	Surface and Core Samples	Blind Field Sample Splits	Blind Field Replicates	Method Blanks	Rinsate Blanks	Lab Replicates	MS/MSDs	CRMs/ SRMs <sup>2</sup>	
Chemical characterization:									
Grain size	77	3	6	-	-	8	-	-	94
Total volatile solids	77	3	6	8	-	8	-	-	102
Total organic carbon	77	3	6	4	-	8	4	2	104
Ammonia	77	3	6	4	-	8	4	-	102
pH	77	3	6	-	-	8	-	-	94
Total sulfides	77	3	6	4	-	8	4	-	102
Metals (incl. Hg)	77	3	6	4	4	4	4	2	104
ABNs	77	3	6	4	4	-	8	2	104
Pesticides/PCBs	77	3	6	4	4	-	8	2	104
Volatile organics	77	3	6	4	4	-	8	2	104
Tributyltin <sup>2</sup>	15	1	2	2	2	-	4	2	28

<sup>1</sup> The estimated numbers of QC samples reported in this table are based on the estimated number of sample delivery groups (SDGs) provided to the laboratories. If more SDGs are provided, then the number of QC samples will increase accordingly. With the exception of TBT, this table is based on 3 SDGs. QC numbers for TBT are based on 2 SDGs. Numbers of SDGs were determined by the numbers of samples and the anticipated sampling schedule. QC samples will be identified to the laboratories.

<sup>2</sup> Blind CRMs/SRMs will be analyzed at a frequency of 1 per batch of up to 50 samples. Known CRMs for metals will be analyzed at a rate of 5 percent or 1 per batch of 20 samples as required by PSDDA.

**Striplin Environmental Associates, Inc.**  
**SAP Addendum for Sampling Event 1B**  
**Hylebos Waterway Problem Areas**  
**July 7, 1994**

## **APPENDIX A**

### **Descriptions of Sampling Areas**

## **Sample Area 5201I (West end of pier) AK-WA Shipbuilding Plate 1**

No photograph available for this sample area

Sampling area 5201I is located under the western end of the pier at AK-WA. The composite begins at the farthest point that can be reached by walking bayward from the AK-WA pier. The composite length is approximately 50 feet. There is one mapped outfall in the sampling area (TPCHD No. 91). The bank is not visible at the location from the water. AK-WA currently has an Individual NPDES permit for the discharge of dry dock wastewater and stormwater. AK-WA is conducting an engineering study for stormwater treatment with the objective of eliminating the existing outfalls and re-routing stormwater to a new discharge point (Mercuri 1994). Based on available studies, problem chemicals suspected to be associated with this site include: copper, lead, and zinc (Ecology 1992). Past industrial activities adjacent to the sampling area include shipbuilding and dismantling by Todd Shipyards, the U.S. Navy, and the Zidell Dismantling Corporation.

Samples for compositing will be collected from the following two locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance
1	26 (2 cores)
2	44 (2 cores)

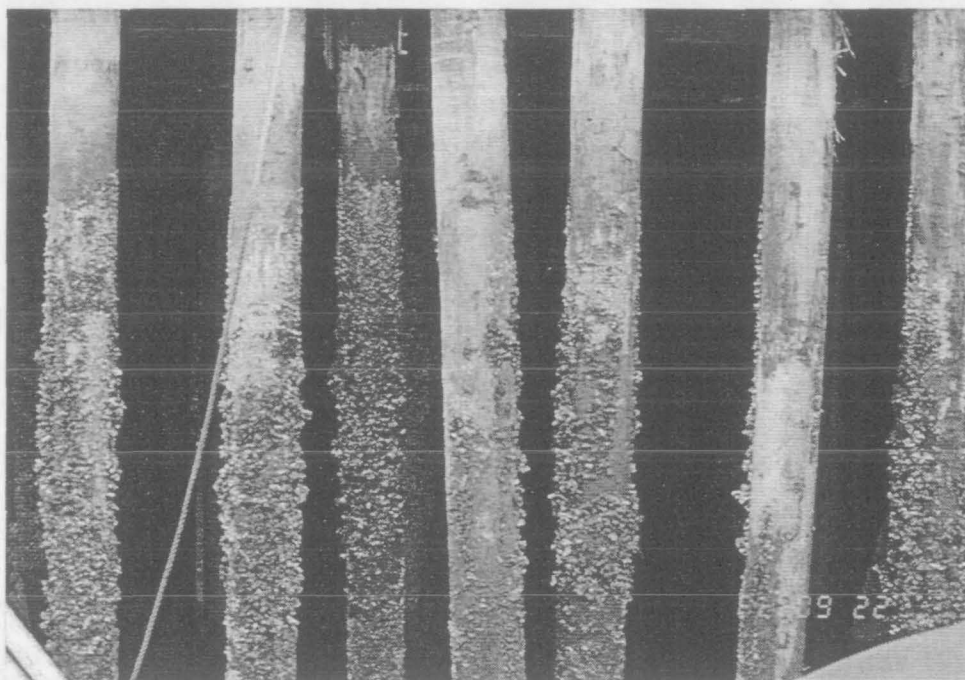


Photo was taken at an estimated tidal height of -0.7 foot

Sampling area 5202I is located under the pier between AK-WA and the Port Industrial Yard. The composite length is approximately 300 feet. There is one mapped outfall in the sampling area (TPCHD No. 90-). The bank is not visible at the location from the water. AK-WA currently has an Individual NPDES permit for the discharge of dry dock wastewater and stormwater. AK-WA is conducting an engineering study for stormwater treatment with the objective of eliminating the existing outfalls and re-routing stormwater to a new discharge point (Mercuri 1994). Based on available studies, problem chemicals suspected to be associated with this site include: copper, lead, and zinc (Ecology 1992). Past industrial activities adjacent to the sampling area include shipbuilding and dismantling by Todd Shipyards, the U.S. Navy, and the Zidell Dismantling Corporation.

Samples for compositing will be collected from the following six locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance	No.	Distance
1	45	4	173
2	72	5	236
3	141	6	295

Sample Area 5203I (East end of pier) Port Industrial Yard Plate 3

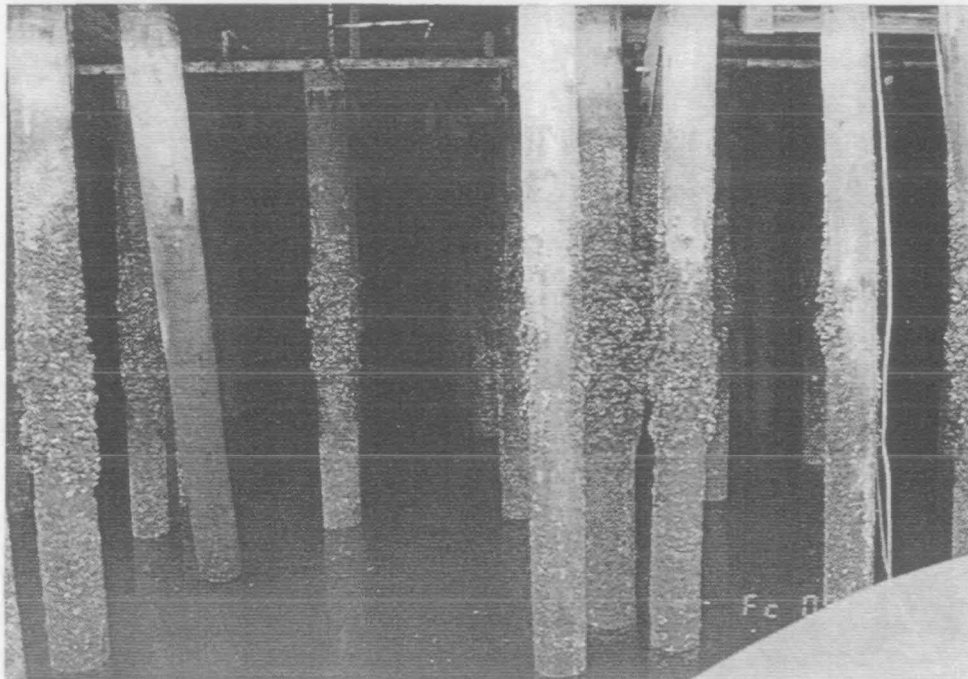


Photo was taken at an estimated tidal height of -0.8 foot

Sampling area 5203I is under the eastern end of the pier adjacent to the Port of Tacoma Industrial Yard. The composite length is approximately 800 feet. There are ten outfall pipes listed on the TPCHD map for the sampling area (TPCHD No. 87-89). The bank in the sample composite area is under the pier and not visible from the waterway. Based on available studies, problem chemicals suspected to be associated with this site include: copper, lead, and zinc (Ecology 1992). Past industrial activities adjacent to the sampling area include shipbuilding and dismantling by Todd Shipyards, the U.S. Navy, and the Zidell Dismantling Corporation.

Samples for compositing will be collected from the following eight locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance	No.	Distance
1	64	5	401
2	110	6	529
3	287	7	632
4	351	8	755

**Sample Area 5204I**

**Occidental Chemical Corporation**

**Plate 4**

This sample is to be a potential source material sample. Its location will be determined at the time of sampling by the HCC and EPA.





Photo was taken at an estimated tidal height of -1.0 foot

Sample area 5205I is located at the toe of the bank and extends for about 200 feet eastward. There are three drains on the bank listed on the TPCHD map (No. 85 and 86). Occidental Chemical Corporation currently has an Individual NPDES permit for the discharge of wastewater and stormwater. The bank consists of small rocks on the slope and a coarse-grained, sand-like material at the toe of the bank. This is the area identified in Ecology's Milestone 2 report where groundwater may surface and seep into the waterway. Based on available studies, problem chemicals which are suspected to be associated with this site include: trichloroethane, 1,2-dichloroethylene, tetrachloroethane, hexachlorobenzene, and hexachlorobutadiene and various metals including copper, chromium, cadmium, lead, and zinc (Ecology 1992, Ecology 1993a).

Samples for compositing will be collected from the following four locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance	No.	Distance
1	38	3	117
2	92	4	174



Photo was taken at an estimated tidal height of -1.1 feet

The sampling area is behind the western portion of Occidental Chemical No. 1 dock. The length of the composite segment is approximately 150 feet. There is one drain mapped just to the west of the sampling location (TPCHD No. 85). Occidental Chemical Corporation currently has an Individual NPDES permit for the discharge of wastewater and stormwater. In part, the bank consists of anthropogenic material of unknown origin. Based on available studies, problem chemicals suspected to be associated with this site include: trichloroethane, 1,2-dichloroethylene, tetrachloroethane, hexachlorobenzene, hexachlorobutadiene and various metals including copper, chromium, cadmium, lead, and zinc (Ecology 1992, Ecology 1993a). The facility at Occidental Chemical Corporation was previously operated by the Hooker Chemical Corporation.

Samples for compositing will be collected from the following three locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance
1	45 (2 cores)
2	92 (2 cores)
3	112 (2 cores)



Photo was taken at an estimated tidal height of -1.1 feet

The sampling area is at the eastern end of Occidental Chemical's No. 1 dock. The length of the composite sample is approximately 100 feet. There are two outfall pipes in or adjacent to the composite area listed on the TPCHD map [No. 766, 84 (not in use)]. Occidental Chemical Corporation currently has an Individual NPDES permit for the discharge of wastewater and stormwater. The bank consists of small rocks on the slope with fine-grained, sand-like material at the toe of the bank. Also noted on the toe of the bank was reddish material of unknown characteristics. Based on available studies, problem chemicals suspected to be associated with this site include: trichloroethane, 1,2-dichloroethylene, tetrachloroethane, hexachlorobenzene, hexachlorobutadiene and various metals including copper, chromium, cadmium, lead, and zinc (Ecology 1992, Ecology 1993a). The facility at Occidental Chemical Corporation was previously operated by the Hooker Chemical Corporation.

Samples for compositing will be collected from the following two locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance
1	42 (2 cores)
2	95 (2 cores)



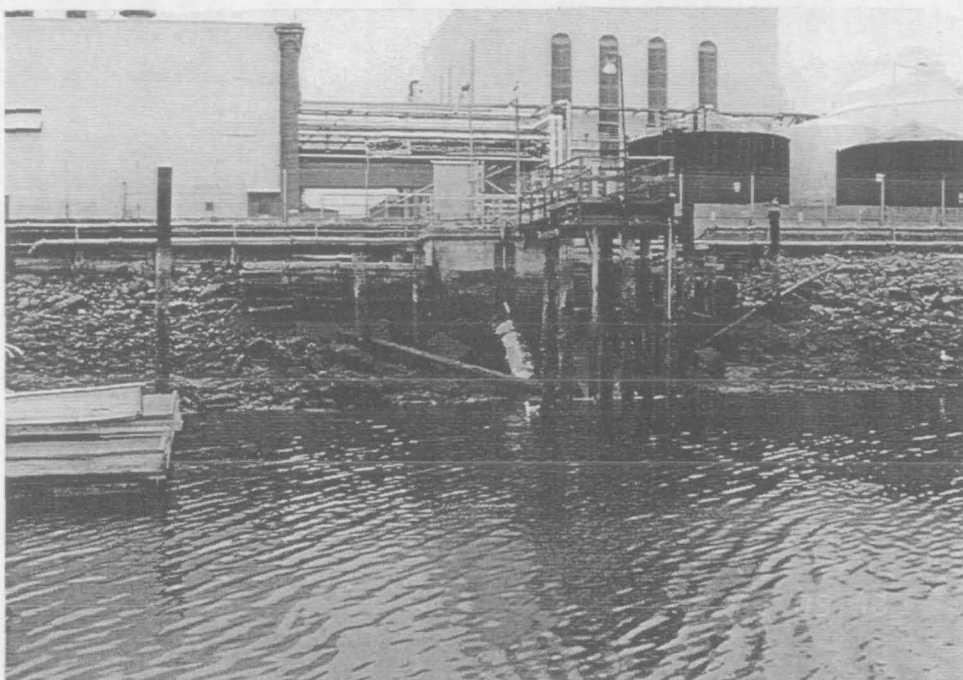


Photo was taken at an estimated tidal height of -1.2 feet

The sample area is in the middle portion of the Occidental facility between Occidental Chemical No. 2 dock and the eastern edge of dock No. 1. It includes the bank area inshore of the main Occidental outfall (TPCHD No. 707). Occidental Chemical Corporation currently has an Individual NPDES permit for the discharge of wastewater and stormwater. The sample composite area is approximately 245 feet in length. The bank consists of large rip rap and the sample will be composited from fine to coarse sand at the toe of the rip rap. Based on available studies, problem chemicals suspected to be associated with this site include: trichloroethane, 1,2-dichloroethylene, tetrachloroethane, hexachlorobenzene, hexachlorobutadiene and various metals including copper, chromium, cadmium, lead, and zinc (Ecology 1992, Ecology 1993a). The facility at Occidental Chemical Corporation was previously operated by the Hooker Chemical Corporation.

Samples for compositing will be collected from the following five locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance	No.	Distance
1	23	4	170
2	85	5	237
3	115		



Photo was taken at an estimated tidal height of -1.4 feet

The sampling area is at the east end of the Occidental property. The length of the composite area extends for approximately 650 feet. There are six outfall pipes in the composite area listed on the TPCHD map [No. 83 (not in use)]. Occidental Chemical Corporation currently has an Individual NPDES permit for the discharge of wastewater and stormwater. The upslope portion of the bank consists of rip rap with finer sediment at the toe of the slope. Based on available studies, problem chemicals suspected to be associated with this site include: trichloroethane, 1,2-dichloroethylene, tetrachloroethane, hexachlorobenzene, hexachlorobutadiene and various metals including copper, chromium, cadmium, lead, and zinc (Ecology 1992a, Ecology 1993a). The facility at Occidental Chemical Corporation was previously operated by the Hooker Chemical Corporation.

Samples for compositing will be collected from the following nine locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance	No.	Distance
1	29	6	398
2	85	7	466
3	186	8	596
4	276	9	632
5	313		

**Sample Area 5210I**

**PRI Northwest**

**Plate 10**

This sample is to be a potential source material sample. Its location will be determined at the time of sampling by the HCC and EPA.





Photo was taken at an estimated tidal height of -1.4 feet

The sampling area extends across the entire shoreline of the property. The length of the composite area is approximately 175 feet. The bank and shoreline are covered with concrete and asphalt blocks and other debris. Carbon electrodes were found on the east end of the bank by Ecology (Mercuri 1994). Ecology sampled the bank sediment in 1992 and found copper, lead, perchloroethylene, trichloroethylene, and dichloroethylene (Coleman 1992a, 1992b). Past industrial practices at the site include seafood processing by Alaska Seafood Co. and petroleum storage by the Fletcher and United Independent Oil Companies.

Samples for compositing will be collected from the following four locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance	No.	Distance
1	26	3	130
2	77	4	166



Photo was taken at an estimated tidal height of -1.4 feet

The sampling area extends across the face of the bank behind the USN Dock. The length of the composite area is approximately 750 feet. Four drains and one outfall pipe are listed on the TPCHD map as being in the composite area (TPCHD No. 81, 82). The bank consists of concrete rubble and blocks. Based on available studies, problem chemicals suspected to be associated with stormwater draining off of the paved truck yard at this site include: copper, lead, and zinc (Mercuri 1992a). Past industrial practices at the site include petroleum product storage by General Petroleum, Lillyblad Petroleum, U.S. Air Force, and U.S. Navy.

Samples for compositing will be collected from the following eight locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance	No.	Distance
1	20	6	413
2	76	7	463
3	156	8	540
4	275	9	631
5	322	10	733





Photo was taken at an estimated tidal height of -1.5 feet

The sampling area extends across the face of the bank. The length of the composite area is approximately 425 feet. Two outfall pipes are mapped in the sampling area (TPCHD No. 79, 80). The bank has been rip rapped with concrete rubble and blocks. Based on available studies, problem chemicals which are suspected to be associated with this site include: PCB's, ethylbenzene, copper, lead, and zinc (Ecology 1992a).

Samples for compositing will be collected from the following nine locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance	No.	Distance
1	40	6	262
2	77	7	317
3	144	8	379
4	187	9	405
5	222		



Photo was taken at an estimated tidal height of -0.2 foot

The sampling area extends across the face of the marina excluding a small sandy beach at the west end of the property in front of the Commencement Bay Marina. The length of the composite area is approximately 875 feet. Two outfall pipes are listed on the TPCHD map as being at the east end of the composite area (TPCHD No. 1). The top portion of the bank consists of concrete blocks and rubble with sand at the toe of the slope. Based on available studies, problem chemicals suspected to be associated with this site include: arsenic, copper, and zinc (Herold 1992a).

Samples for compositing will be collected from the following nine locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance	No.	Distance
1	50	6	515
2	193	7	638
3	277	8	782
4	323	9	835
5	432		

Sample Area 4201I W. of the City of Tacoma Steam Plant Plate 15



Photo was taken at an estimated tidal height of -1.5 feet

The sampling area extends from the western edge of the Tacoma Steam Plant to under the 11th Street Bridge. The length of the composite area is approximately 425 feet. There are three outfalls listed on the TPCHD map as being in the composite area (TPCHD No. 76, 78, 794). Outfall numbers 78 and 794 drain the roadway at the 11th Street Bridge. The top of the bank has been rip rapped with concrete blocks and other debris and the bottom of the bank leads to a broad mud and sand flat.

Samples for compositing will be collected from the following nine locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance	No.	Distance
1	30	6	292
2	94	7	346
3	147	8	382
4	171	9	411
5	244		



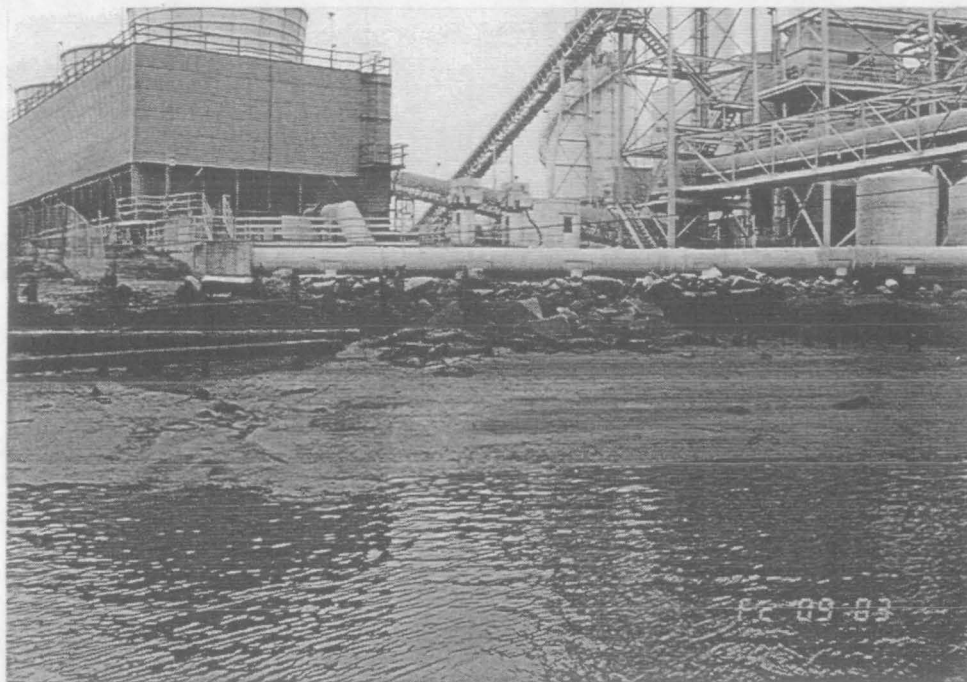


Photo was taken at an estimated tidal height of -1.4 feet

The sampling area extends from the eastern property line to the concrete bulkhead directly in front of the plant. The length of the composite area is approximately 275 feet. There are two outfall pipes listed on the TPCHD map as being in the sampling area (TPCHD No. 75). The bank at the top of the eastern edge of the sampling area is rip rapped with large concrete blocks, while the toe of the bank is a large sand flat. The western edge of the sampling area is at the base of the concrete bulkhead and will need to be sampled at a minus tide. One soil sample collected and analyzed by Ecology in 1991 contained elevated levels of arsenic and mercury above sediment quality objectives (Gooding and White 1991). Historically, several waste streams were generated at the plant that included PCB's and PAH's. The steam plant has been in operation since 1923.

Samples for compositing will be collected from the following six locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance	No.	Distance
1	45	4	196
2	74	5	237
3	113	6	267

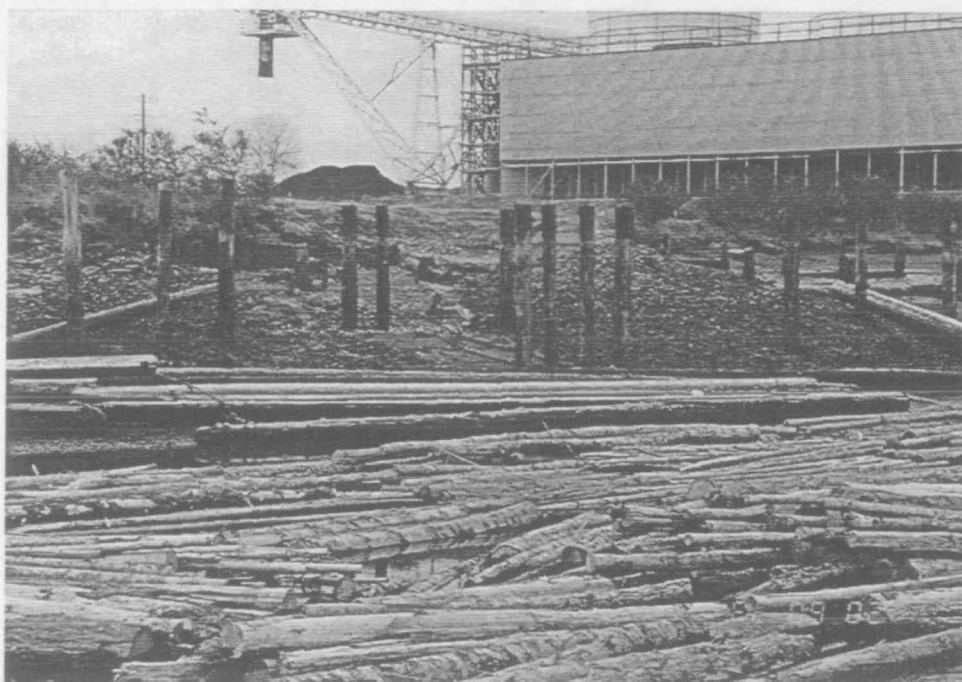


Photo was taken at an estimated tidal height of -1.4 feet

The sampling area is located along the western half of the Taylor Way Properties across an area where a large number of bricks were dumped over the bank. The length of the composite area is approximately 250 feet. The upper bank consists of small sized concrete debris and crumbling old pier and bulkhead supports. The lower portion of the bank consists of tidally flooded, coarse sandy material, which is covered with log rafts. Between the log rafts blue/black clay was seen where it had been scoured by the rafts. Log rafts permitting, sampling will be conducted on the toe of the bank in the sand flat. Sampling by Ecology in the intertidal in 1991 in the mid and western portions of the property found PCB's, arsenic, copper and lead (Ecology 1992b). Historically the site has been used by the pulp and paper industry (i.e. Shaffer Box and Pulp companies, ITT Rayonier) and by the chemical processing industry (Tacoma Powdered Metals, Burlington Environmental)

Samples for compositing will be collected from the following five locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance	No.	Distance
1	10	4	168
2	74	5	245
3	124		



Photo was taken at an estimated tidal height of -1.4 feet

The sampling area is located in the mid section of the Taylor Way Properties. The length of the composite area is approximately 425 feet. The top of the bank is littered with concrete debris, and crumbling pier and bulkhead supports. The lower bank contains coarse sandy material over what appears to be blue/gray clay. Extensive log rafts cluttered the area where sampling will be conducted. Ecology intertidal sampling in 1991 in the mid and western portions of the property found PCB's, arsenic, copper, and lead (Ecology 1992b). Historically the site has been used by the pulp and paper industry (i.e. Shaffer Box and Pulp companies, ITT Rayonier) and by the chemical processing industry (Tacoma Powdered Metals, Burlington Environmental).

Samples for compositing will be collected from the following nine locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance	No.	Distance
1	23	6	288
2	64	7	322
3	112	8	393
4	171	9	417
5	232		



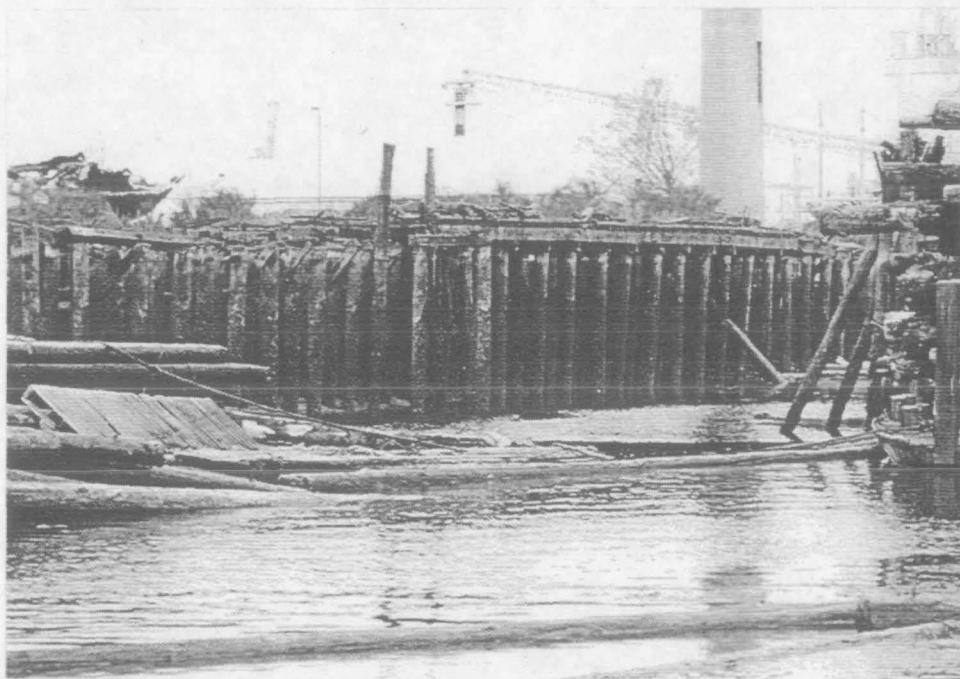


Photo was taken at an estimated tidal height of -1.3 feet

The sampling area is located behind the decaying dock at the east end of the Taylor Way Properties. The length of the composite area is approximately 400 feet. There is a ditch outfall along the east end of the property mapped by the TPCHD (No. 74). There is a wood bulkhead behind the dock and the shoreline behind it is crumbling leaving a space between the bulkhead and the actual shore. Ecology conducted intertidal sampling in 1991 in the mid and western portions of the property and found PCB's, arsenic, copper and lead (Ecology 1992b). Historically the site has been used by the pulp and paper industry (i.e. Shaffer Box and Pulp companies, ITT Rayonier) and by the chemical processing industry (Tacoma Powdered Metals, Burlington Environmental).

Samples for compositing will be collected from the following eight locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance	No.	Distance
1	18	5	215
2	77	6	297
3	133	7	318
4	188	8	375



Photo was taken at an estimated tidal height of -1.2 feet

The sampling area is the entire embayment surrounding the open channel ditch (TPCHD No. 73). The length of the composite area is approximately 300 feet. In addition to the open channel ditch (TPCHD No. 73) there are three drain pipes listed on the TPCHD map as being in the composite area (TPCHD No. 72). The bank and shoreline are littered with cables and other metal debris. Ecology noted piles of what appeared to be shop floor sweepings or welding slag on the shore. Based on available studies, problem chemicals suspected to be associated with this site include: arsenic, copper, lead, and zinc (Herold 1992b). The site was previously used by Rail and Locomotive Co. as a yard for dismantling railroad cars.

Samples for compositing will be collected from the following six locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance	No.	Distance
1	25	4	177
2	87	5	221
3	149	6	257



(See 3221I for adjacent Sound Refining Co. sampling area)



Photo was taken at an estimated tidal height of 0.2 foot

The sampling area extends from the point at the west end of the property to the mid portion of the bulkhead at Sound Refining. The length of the composite area is approximately 400 feet. There are six outfall pipes listed on the TPCHD map as being in the composite area (TPCHD No. 15, 16, 17, and 704). Sound Refining Inc. has an Individual NPDES permit to discharge treated process wastewater and stormwater into the waterway. The bank is shored with a wooden bulkhead that is crumbling in many places. The lower bank could not be observed during the reconnaissance survey due to the tide level. Problem chemicals found near the NPDES permitted outfall during monitoring included: hexachlorobenzene, benzyl alcohol, phenol, PCB's, arsenic, copper, and zinc (Parametrix 1992).

Samples for compositing will be collected from the following eight locations along a single horizontal transect between +6' to +12' MLLW.

No.	Distance	No.	Distance
1	15	5	236
2	62	6	291
3	136	7	323
4	197	8	395

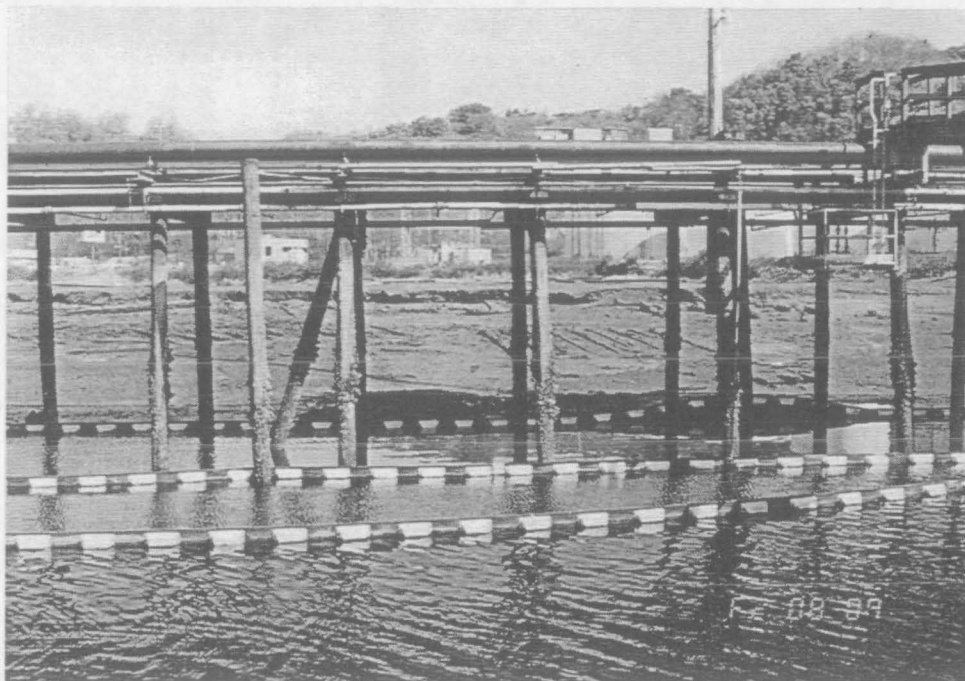


Photo was taken at an estimated tidal height of 0.4 foot

The sampling area extends along the bank adjacent to the broad tideflat at the west end of the property. The length of the composite area is approximately 400 feet. Sound Refining Inc. has an Individual NPDES permit to discharge treated process wastewater and stormwater into the waterway. The bank is low and drops rapidly into a long, low sloping mud and sand flat. The intertidal area below the bank is littered with wood and metal debris. Based on available studies, problem chemicals which are suspected to be associated with this site include: hexachlorobenzene, benzyl alcohol, phenol, PCB's, arsenic, copper, and zinc (Parametrix 1992).

This sampling area will be one of three areas where blind field splits and replicates will be collected.

Samples for compositing will be collected from the following eight locations along a single horizontal transect between 0' to +12' MLLW.

No.	Distance	No.	Distance
1	31	5	235
2	59	6	298
3	150	7	316
4	175	8	365

No photograph available for this sample area

The sampling area is located in the high intertidal zone off of the parking lot at the offices of the Sound Refining Co. The length of the sample composite area is approximately 220 feet. There are four outfall pipes listed as being in the composite area (TPCHD No. 14). The bank is low and drops rapidly into a long, low sloping mud and sand flat. Based on available studies problem chemicals associated with industries to the east and west of the site include: hexachlorobenzene, benzyl alcohol, phenol, PCB's, arsenic, copper, and zinc (Parametrix 1992, Ecology 1992a).

Samples for compositing will be collected from the following five locations along a single horizontal transect between +8' to +16' MLLW.

No.	Distance	No.	Distance
1	16	4	174
2	85	5	215
3	128		





Photo was taken at an estimated tidal height of 0.4 foot

The sampling area is located in the high intertidal zone off of site of the former Bay Chemical Co. (currently Airo Services) and Banyan Rail Services and adjacent to 11th street bridge. The length of the sample composite area is approximately 250 feet. There are three outfall pipes listed as being in the composite area (TPCHD No. 10,11,and 735). The bank is low and drops rapidly into a long, low sloping mud and sand flat. Based on available studies problem chemicals associated with the site include: arsenic, copper, lead, nickel and zinc (Ecology 1992a).

Samples for compositing will be collected from the following five locations along a single horizontal transect between +6' to +12' MLLW.

No.	Distance	No.	Distance
1	18	4	171
2	99	5	222
3	129		



Photo was taken at an estimated tidal height of -1.0 foot

The sampling area is located at the toe of the slope across the front of the property. The length of the composite area is approximately 350 feet. There are two outfall pipes listed on the TPCHD map as being at the top of the bank above the composite area. The bank consists of large flat concrete blocks with some metal debris on them. Three releases of problem chemicals were reported in the past including PAH's, copper, lead, and zinc (Gooding 1990a, Crosby & Overton, 1988). The lower portion of the bank is covered with log rafts, but where visible, sediments appeared to be sand and mud.

This sampling area will be one of three areas where blind field splits and replicates will be collected.

Samples for compositing will be collected from the following seven locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance	No.	Distance
1	24	5	235
2	72	6	255
3	134	7	334
4	173		

**Sample Area 3202I**

**Buffelen Woodworking Co.**

**Plate 26**

This sample is to be a potential source material sample. Its location will be determined at the time of sampling by the HCC and EPA.



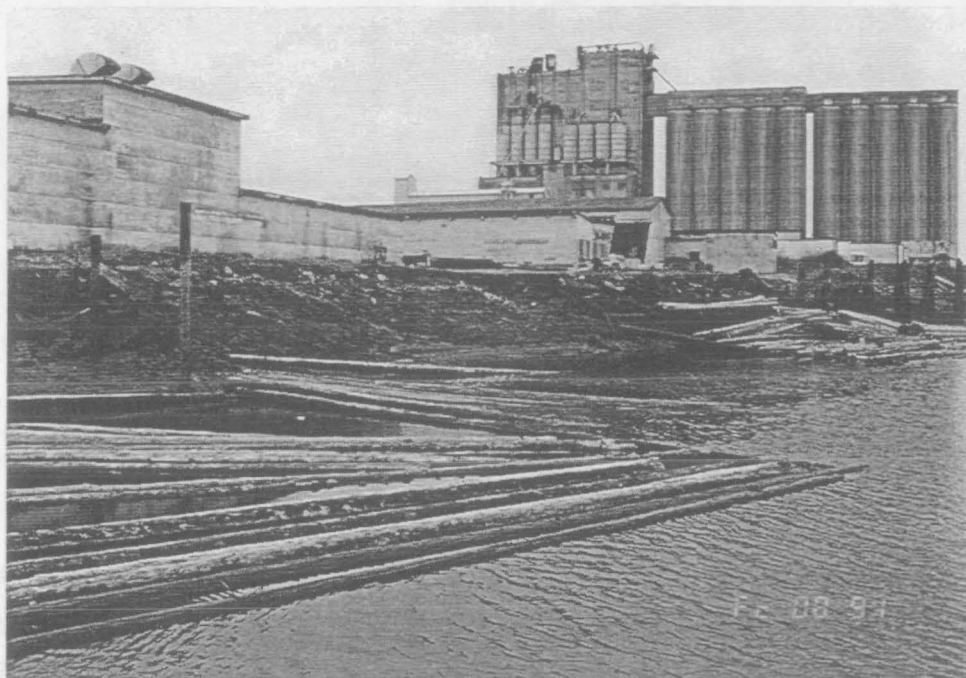


Photo was taken at an estimated tidal height of -1.0 foot.

The sampling area is located at the western edge of the property adjacent to Cenex. The length of the composite area is approximately 350 feet. Two outfall pipes, and a drainage ditch are listed on the TPCHD map as being in the composite area (TPCHD No. 71). Buffelen Woodworking Co. has a General NPDES permit for the discharge of stormwater runoff to the waterway. The bank consists of broken concrete debris, rock and old dock pilings. The bulkhead at the top of the bank is being undercut and is crumbling into the intertidal area. The lower intertidal area is scoured by log rafts and the material between the rafts appears to be sand overlaying blue/gray clay. Based on available studies, problem chemicals which are suspected to be associated with this site include: PCB's, formaldehyde, arsenic, copper, chromium, lead, mercury, nickel, and zinc (Buffelen 1988, Hart Crowser 1989). The Buffelen Woodworking Company or its predecessors have manufactured wood products at the site since 1910.

Samples for compositing will be collected from the following seven locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance	No.	Distance
1	22	5	219
2	60	6	296
3	137	7	347
4	171		

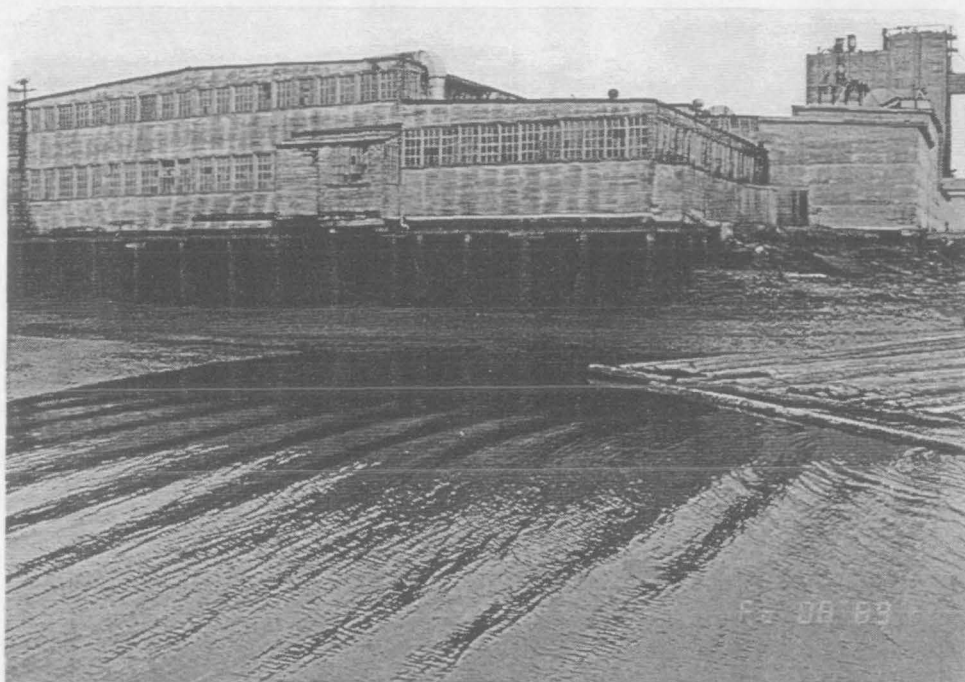


Photo was taken at an estimated tidal height of -0.9 foot

The sampling area is located on the western side of the small embayment (Hylebos Inlet) overhung by a portion of the old veneer factory. The length of the composite area is approximately 300 feet. There are two outfall pipes listed on the TPCHD map that drain onto the composite area (TPCHD No. 70). Buffelen Woodworking Co. has a General NPDES permit for the discharge of stormwater runoff to the waterway. The intertidal area below the bank consists of coarse sand, gravel, and mud. Based on available studies, problem chemicals which are suspected to be associated with this portion of the site include: PCB's, formaldehyde, arsenic, copper, chromium, lead, mercury, nickel, and zinc (Buffelen 1988, Hart Crowser 1989). The Buffelen Woodworking Company or its predecessors have manufactured wood products at the site since 1910.

Samples for compositing will be collected from the following six locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance	No.	Distance
1	47	4	168
2	69	5	215
3	147	6	260



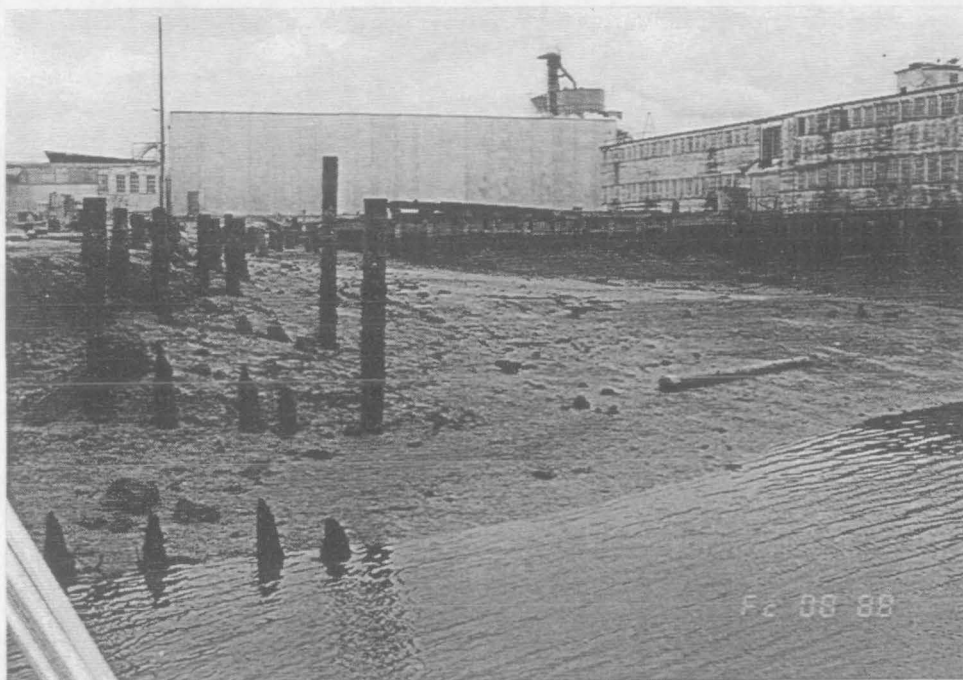


Photo was taken at an estimated tidal height of -0.9 foot

The sampling area is adjacent to the pentachlorophenol (PCP) cleanup area at the east side of Hylebos Inlet. The length of the composite area is approximately 300 feet. There is one outfall pipe listed on the TPCHD map that drain adjacent to the west side of the composite area. Buffelen Woodworking Co. has a General NPDES permit for the discharge of stormwater runoff to the waterway. The bank and surrounding intertidal area are full of decaying pier pilings and log debris. There is a wide shallow ditch that drains the PCP cleanup area. The PCP area is slated to be capped. Based on available studies, problem chemicals which are suspected to be associated with this portion of the site include: PCP, PCB's, formaldehyde, arsenic, copper, chromium, lead, mercury, nickel, and zinc (Buffelen 1988, Hart Crowser 1989). The Buffelen Woodworking Company or its predecessors have manufactured wood products at the site since 1910.

Samples for compositing will be collected from the following six locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance	No.	Distance
1	40	4	169
2	89	5	217
3	143	6	279



Photo was taken at an estimated tidal height of -0.8 foot

The sampling area extends from the PCP cleanup area east to the Lincoln Street right-of-way. The length of the composite area is approximately 225 feet. There is one outfall pipe in the composite area listed on the TPCHD map (TPCHD No. 68). Buffelen Woodworking Co. has a General NPDES permit for the discharge of stormwater runoff to the waterway. The bank is being undercut in this area by erosion and the upper intertidal area consists of asphalt and concrete rubble from the broken bulkhead and parking lot. Buffelen received a shoreline permit to stabilize the bank along this portion of the property. Based on available studies, problem chemicals which are suspected to be associated with this portion of the site include: PCP, PCB's, formaldehyde, arsenic, copper, chromium, lead, mercury, nickel, and zinc (Buffelen 1988, Hart Crowser 1989). The Buffelen Woodworking Company or its predecessors have manufactured wood products at the site since 1910.

Samples for compositing will be collected from the following five locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance	No.	Distance
1	35	4	188
2	81	5	215
3	112		

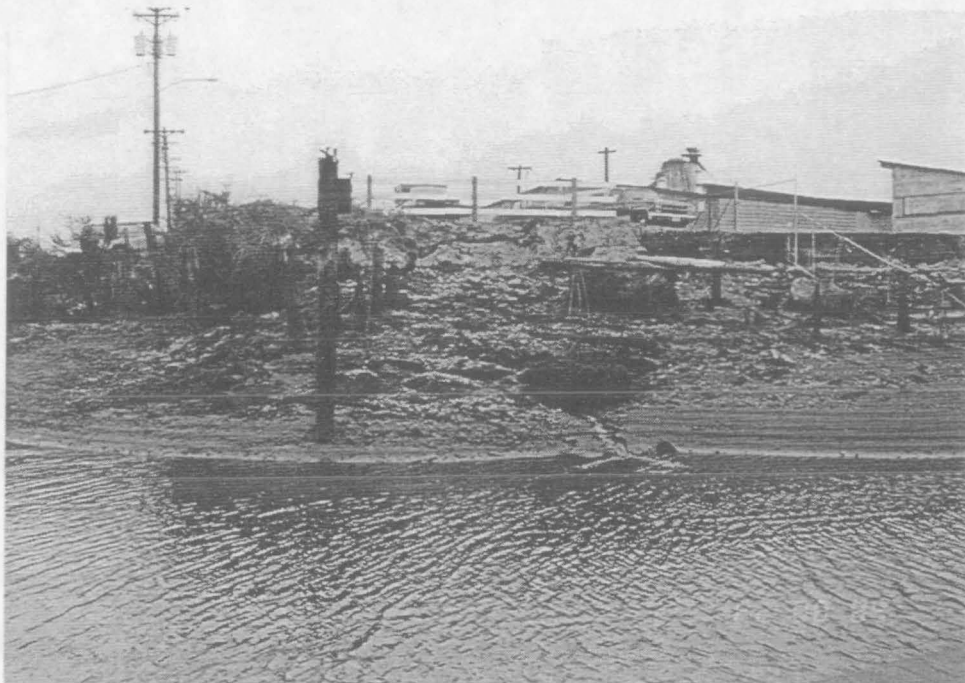


Photo was taken at an estimated tidal height of 0.4 foot

The sampling area is located in the intertidal embayment off the end of Lincoln Street. The length of the sample composite area is approximately 240 feet. A large storm drain from Lincoln Street (TPCHD No. 66) discharges to the western end of the composite area. The bank consists of broken concrete rubble, rip rap material, and the remains of concrete pilings. Based on available studies problem chemicals associated with adjacent sites include: pentachlorophenol, PCB's, arsenic, copper, lead, and zinc (Tetra Tech 1985).

Samples for compositing will be collected from the following three locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance	No.	Distance
1	20	4	178
2	97	5	223
3	118		



Sample Area 3208I

Murray Pacific Corp. Log Yard 1

Plate 32

This sample is to be a potential source material sample. Its location will be determined at the time of sampling by the HCC and EPA.



Photo was taken at an estimated tidal height of -0.4 foot

The sampling area is located on the western portion of the property. The length of the composite area is approximately 380 feet. There are two TPCHD listed drain pipes adjacent to the composite area (TPCHD No. 65). The upper bank contains slag (used as ballast), which may be inundated at high tide. The lower bank is gravelly with clay and cobble. Based on available studies, problem chemicals which are suspected to be associated with this portion of the site include: arsenic, copper, lead, and zinc (Tetra Tech 1985). A portion of the upland area adjacent to the sampling area was used by Seaport Bark and Supply Co. to reclaim beauty bark from log sort yard debris.

Samples for compositing will be collected from the following eight locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance	No.	Distance
1	8	5	241
2	98	6	279
3	120	7	314
4	170	8	375

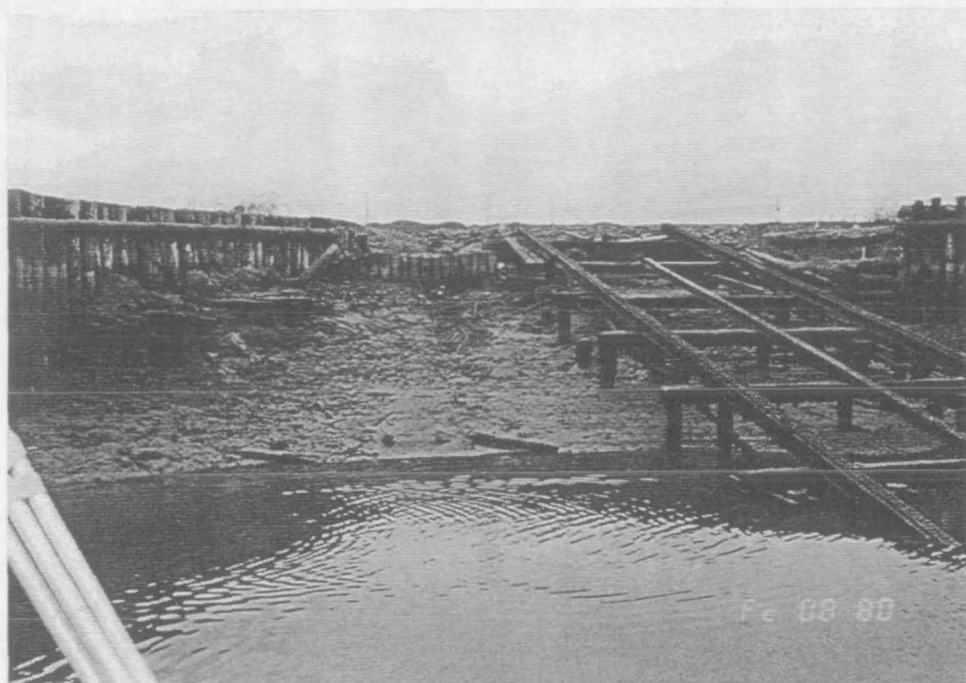


Photo was taken at an estimated tidal height of -0.1 foot

The sampling area is located at the log ramp in the middle of the property. The length of the composite area is approximately 100 feet. The upper bank consists of a decaying wood bulkhead and the lower portion appears to be compact clay. Based on available studies, problem chemicals which are suspected to be associated with this portion of the site include: arsenic, copper, lead, and zinc (Tetra Tech 1985). A portion of the upland area adjacent to the sampling area was used by Seaport Bark and Supply Co. to reclaim beauty bark from log sort yard debris.

Samples for compositing will be collected from the following two locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance
1	28 (2 cores)
2	58 (2 cores)





Photo was taken at an estimated tidal height of 0.1 foot

The sampling area is located at the east end of the property. The length of the composite area is approximately 375 feet. There is one listed outfall pipe in the composite area (TPCHD No. 63). The upper bank consists of fill overlying native clay. The low intertidal contains some broken pier supports and log debris. Based on available studies, problem chemicals which are suspected to be associated with this portion of the site include: arsenic, copper, lead, and zinc (Tetra Tech 1985). A portion of the upland area adjacent to the sampling area was used by Seaport Bark and Supply Co. to reclaim beauty bark from log sort yard debris.

Samples for compositing will be collected from the following eight locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance	No.	Distance
1	28	5	216
2	98	6	299
3	116	7	319
4	170	8	366



Photo was taken at an estimated tidal height of -0.1 foot

The sampling area runs the length of the shore behind the boat houses of the Hylebos Marina. The length of the composite area is approximately 690 feet. The marina has a small boat NPDES permit that requires boat wash water be recycled. The bank is short but steep and rip rapped with concrete rubble. In some places upland debris piles extend into the intertidal area. The property has been used for small boat maintenance and repair. Based on available studies, problem chemicals which are suspected to be associated with this portion of the site include copper and zinc which are associated with boat washing activities (Mercuri 1992a, Ecology 1993a).

Samples for compositing will be collected from the following ten locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance	No.	Distance
1	38	6	449
2	94	7	486
3	218	8	543
4	292	9	669
5	341	10	687



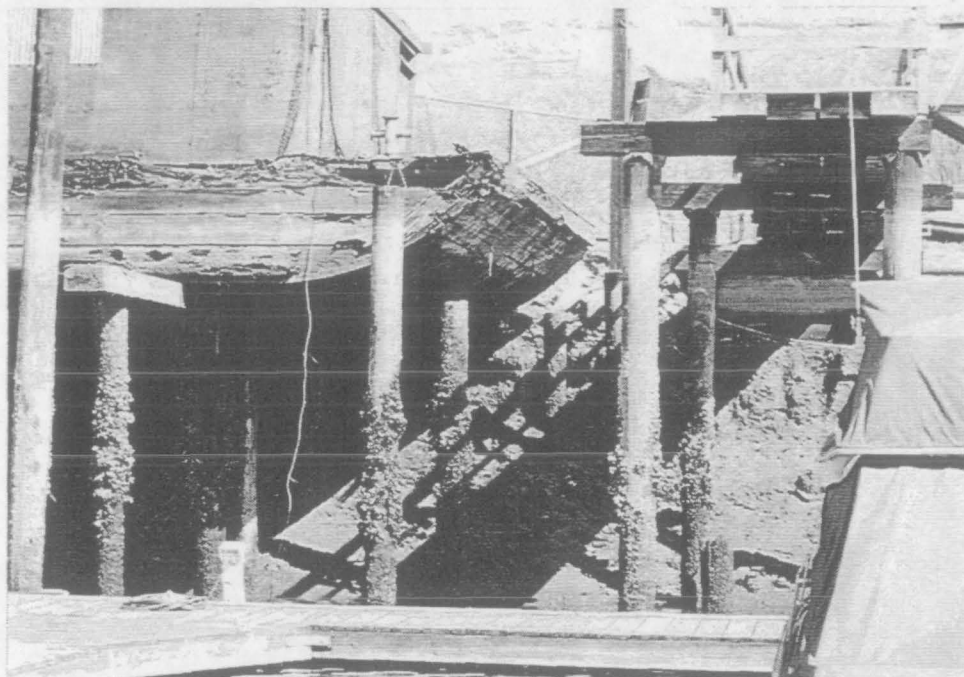


Photo was taken at an estimated tidal height of -0.5 foot

The sampling area is located at an orange colored seep on the upper bank under a barge house. There are no outfall pipes listed on the TPCHD map. The length of the composite area is approximately 25 feet. The marina has a small boat NPDES permit that requires boat wash water be recycled. The bank is vertical under the barge and consists of hard clay. The property has been used for small boat maintenance and repair. Based on available studies, problem chemicals which are suspected to be associated with this portion of the site include copper and zinc associated with boat washing activities (Mercuri 1992b, Ecology 1993a).

Samples for compositing will be collected from the following two locations along a single horizontal transect between 0' to +12' MLLW.

No.	Distance
1	11 (2 cores)
2	18 (2 cores)



Photo was taken at an estimated tidal height of -0.3 foot

The sampling area is at the east end of the small embayment between Mather Auctioneers and the Hylebos Marina. The length of the composite area is approximately 25 feet. The bank in the sample composite area consists of a rubble pile, a concrete bulkhead and the upland area is an autofluff cleanup area (Mercuri 1993). Based on available studies, problem chemicals which are suspected to be associated with this portion of the site include: PCB's, cadmium, copper, lead, nickel, and zinc (Mercuri 1992c, 1993).

Samples for compositing will be collected from the following two locations along a single horizontal transect between 0' to +8' MLLW, in the rubble pile and at the foot of the bulkhead.

No.	Distance
1	10 (2 cores)
2	20 (cores)

No photograph available for this sample area

The sampling area is at the east end of the small embayment on the property line with Mather Auctioneers and the Hylebos Marina. The length of the composite area is approximately 145 feet. The bank in the sample composite area encompasses the boat ramp on the Modutech property. Modutech Marine has a small boat NPDES permit that requires boat wash water be recycled. Based on available studies, problem chemicals which are suspected to be associated with this portion of the site include: PCB's, cadmium, copper, lead, nickel, and zinc (Mercuri 1992c, 1993).

Samples for compositing will be collected from the following three locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance
1	27 (2 cores)
2	96 (2 cores)
3	114 (2 cores)



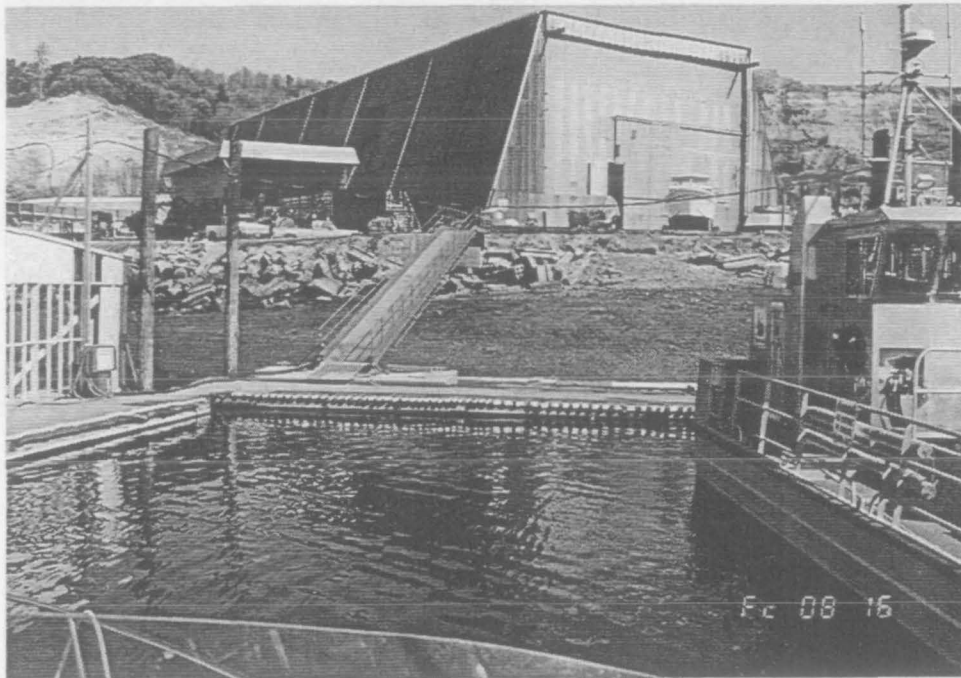


Photo was taken at an estimated tidal height of -0.3 foot

The sampling area extends across the entire shoreline in front of the property. The length of the composite area is approximately 375 feet. Stormwater runoff enters the waterway through TPCHD drain No. 23 which is located on the property between Modutech Marine and Donald Oline. Modutech Marine has a small boat NPDES permit that requires boat wash water be recycled. For the most part the upper bank is covered with concrete rubble, and sandblast grit was found in the intertidal area (Mercuri 1992). Historically, boat wash water has run into the waterway. The property has a shoreline permit to regrade the bank to a 3 to 1 slope within the next year. Based on available studies, problem chemicals which are suspected to be associated with this portion of the site include: PCB's, PAH's, copper, lead, mercury, and zinc (Mercuri 1992d).

Samples for compositing will be collected from the following eight locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance	No.	Distance
1	45	5	218
2	82	6	262
3	140	7	322
4	199	8	357

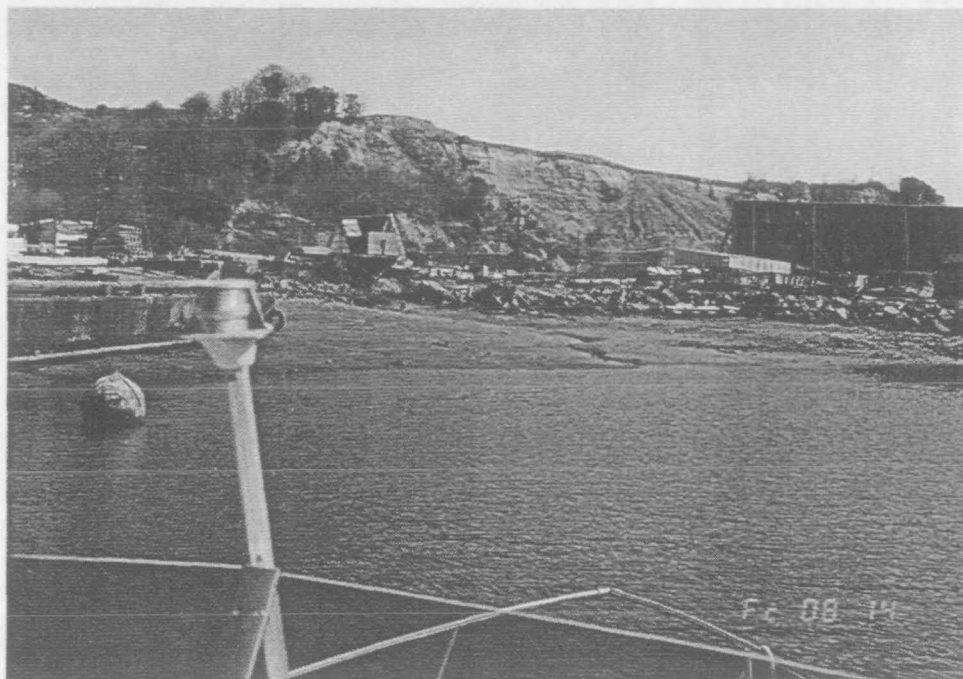


Photo was taken at an estimated tidal height of -0.3 foot

The sampling area is in the middle of the small embayment and includes a portion of both the Modutech Marine and Don Oline properties. The length of the composite area is approximately 300 feet. There are two listed outfall pipes in the sample composite area (TPCHD No. 22, 23). In addition to the outfall pipe there is a channel created by running water from a barge on the west side of the sample composite area. The bank is composed of compact clay with debris covering most of the upper area. The lower bank consists of a small mud flat. Based on available studies, problem chemicals which are suspected to be associated with this portion of the site include: PCB's, PAH's, phenols, phthalates, cadmium, copper, lead, and zinc (Gooding 1991a).

Samples for compositing will be collected from the following six locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance	No.	Distance
1	25	4	161
2	61	5	249
3	120	6	284

.. .  
.. . **Sample Location 3218I**

**Donald Oline**

**Plate 42**

This sample is to be a potential source material sample. Its location will be determined at the time of sampling by the HCC and EPA.



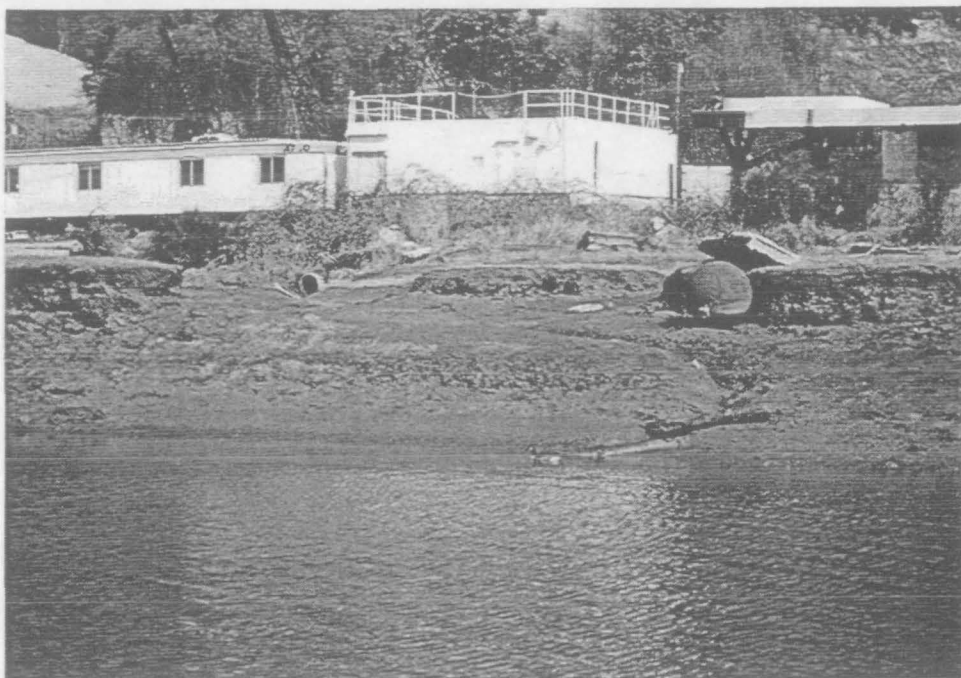


Photo was taken at an estimated tidal height of 0.0 feet

The sampling area is on the western portion of the Oline property, and encompasses two piers. The length of the composite area is approximately 350 feet. There is one listed outfall pipe in the sample composite area (TPCHD No. 21). The bank is similar in composition to that in area 3218I with much debris on the upper bank. Based on available studies, problem chemicals which are suspected to be associated with this portion of the site include: PCB's, PAH's, phenols, phthalates, cadmium, copper, lead, and zinc (Ecology 1993a).

Samples for compositing will be collected from the following seven locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance	No.	Distance
1	21	5	228
2	64	6	269
3	123	7	328
4	160		

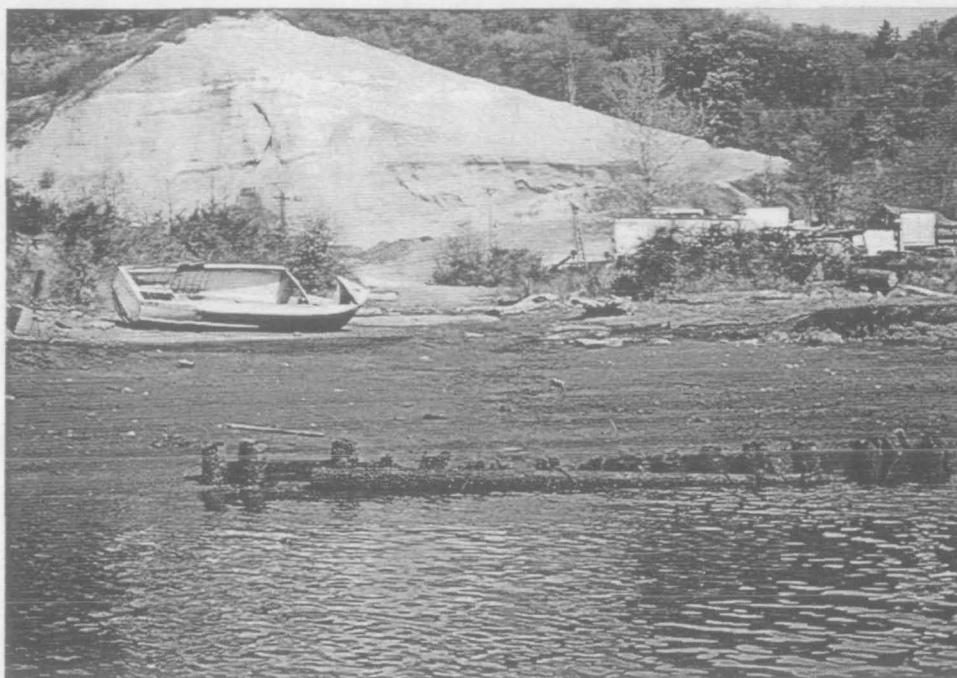


Photo was taken at an estimated tidal height of 0.1 foot

The sampling area is located on the eastern portion of the property and includes a small embayment. The length of the composite area is approximately 400 feet. The property contains one listed outfall pipe (TPCHD No. 20). Wood waste and slag is present in the bank (Mercuri 1994). The upland area is scheduled to be cleaned up during the spring/summer 1994 under a consent decree from Ecology (Mercuri 1994). Slag contamination will be removed only to the top of the bank and not into the intertidal area (Mercuri 1994). Based on available studies, problem chemicals which are suspected to be associated with this portion of the site include: arsenic, copper, lead, and zinc (Norton and Johnson 1988, Applied Geotechnology 1988).

Samples for compositing will be collected from the following eight locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance	No.	Distance
1	42	5	216
2	86	6	275
3	116	7	312
4	185	8	384

**Sample Area 3221I****Sound Refining Inc.****Plate 45**

(See 4207 for adjacent Sound Refining sampling area).



Photo was taken at an estimated tidal height of 0.2 foot

The sampling area is located at the eastern end of the Sound Refining property. The length of the composite area is approximately 430 feet. There are two listed outfall pipes in the sample composite area (TPCHD No. 18 and 19). Sound Refining Inc. has an Individual NPDES permit to discharge treated process wastewater and stormwater into the waterway. The bank is held in place with a wood bulkhead which is back-filled with rubble. The bulkhead is sagging and breaking up in some places. Based on available studies, problem chemicals which are suspected to be associated with this portion of the site include: hexachlorobenzene, benzyl alcohol, phenol, PCB's, arsenic, copper, and zinc (Parametrix 1992).

Samples for compositing will be collected from the following nine locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance	No.	Distance
1	10	6	274
2	86	7	332
3	143	8	360
4	169	9	411
5	239		



**Sample Area 2201I**

**USG Interiors**

**Plate 46**

This sample is to be a potential source material sample. Its location will be determined at the time of sampling by the HCC and EPA.

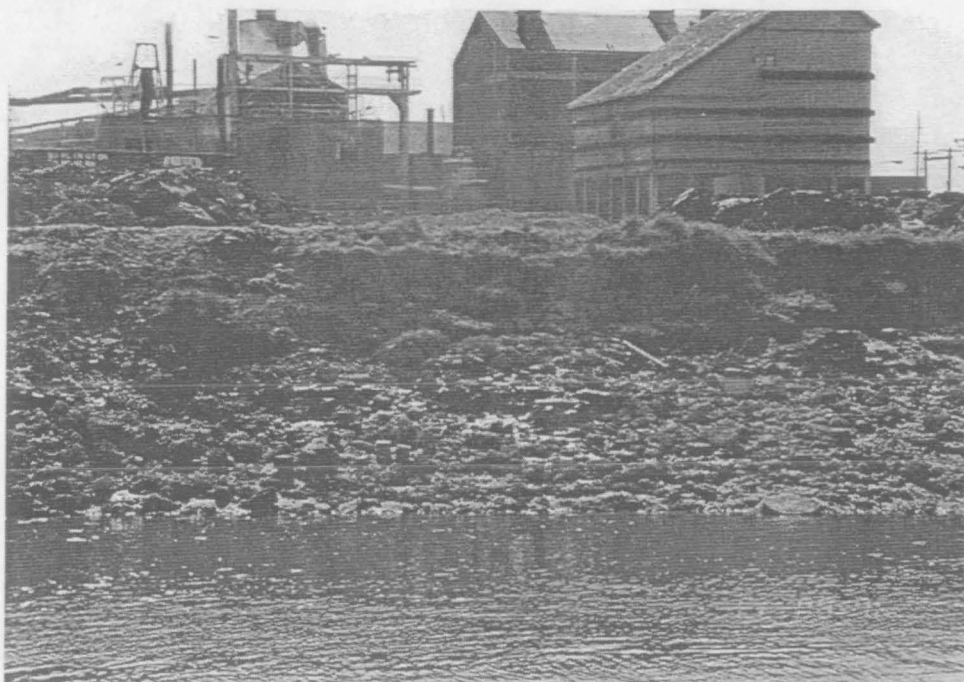


Photo was taken at an estimated tidal height of 3.0 feet

The sampling area is located across the entire shoreline. The length of the composite area is approximately 150 feet. There is one outfall pipe in the sample composite area (TPCHD No. 62). The top of the bank consists of fill and debris. Slag was used as feed material for their rock wool production process at the site, a portion of which was cleaned up in 1973 (Coleman et al. 1992, Mercuri 1994). There were steel drums and other metal debris on the top of the bank and along the shoreline. USG and Ecology signed an agreed order for a phase 1 site investigation on March 1, 1994. Based on available studies, problem chemicals which are suspected to be associated with this portion of the site include: arsenic, copper, chromium, lead, and zinc (Coleman et al. 1992, Ecology 1994).

Samples for compositing will be collected from the following three locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance
1	31 (2 cores)
2	81 (2 cores)
3	129 (2 cores)

**Sample Area 2203I**

**Elf Atochem North America**

**Plate 48**

This sample is to be a potential source material sample. Its location will be determined at the time of sampling by the HCC and EPA.



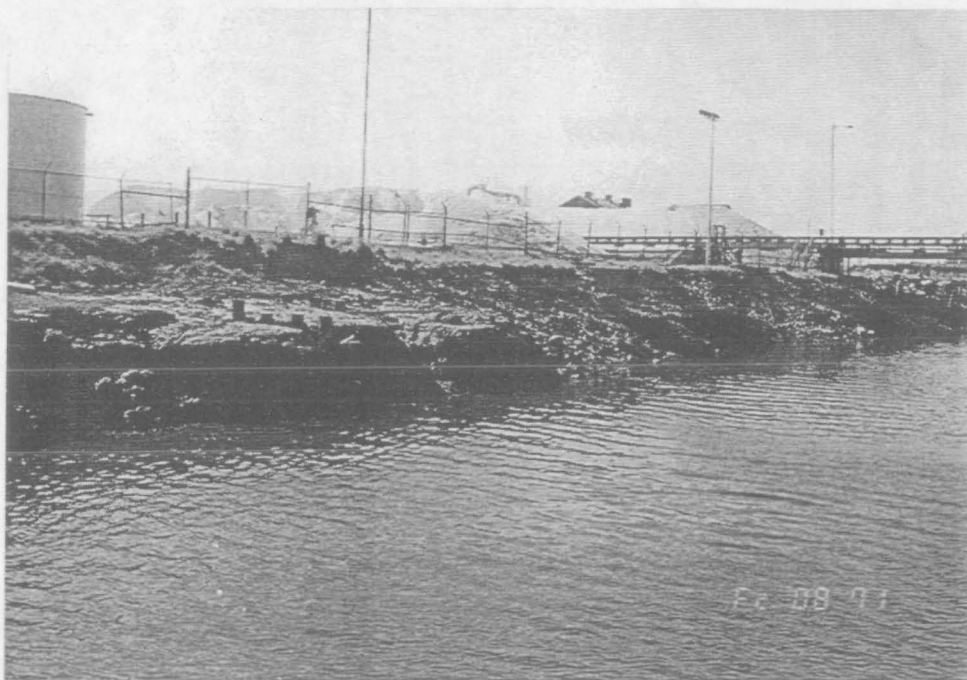


Photo was taken at an estimated tidal height of 2.2 feet

The sampling area is located along the western portion of the property. The length of the composite area is approximately 500 feet. There are two listed outfall pipes in the sample composite area (TPCHD No. 60). Elf Atochem North America has an Individual NPDES permit for the discharge of process wastewater and stormwater to the waterway. The sample composite area is inshore of the new subtidal outfall. The upper bank consists of broken terra-cotta pipe, bricks, and concrete rubble. The mid portion of the bank is clay and in some places there are piling stubs and other wood debris. Based on available studies, problem chemicals which are suspected to be associated with this portion of the site include: perchloroethylene, hexachlorobutadiene, arsenic, chromium, and copper (Tetra Tech 1985, 1988).

Samples for compositing will be collected from the following ten locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance	No.	Distance
1	31	6	288
2	83	7	349
3	138	8	388
4	188	9	422
5	222	10	475

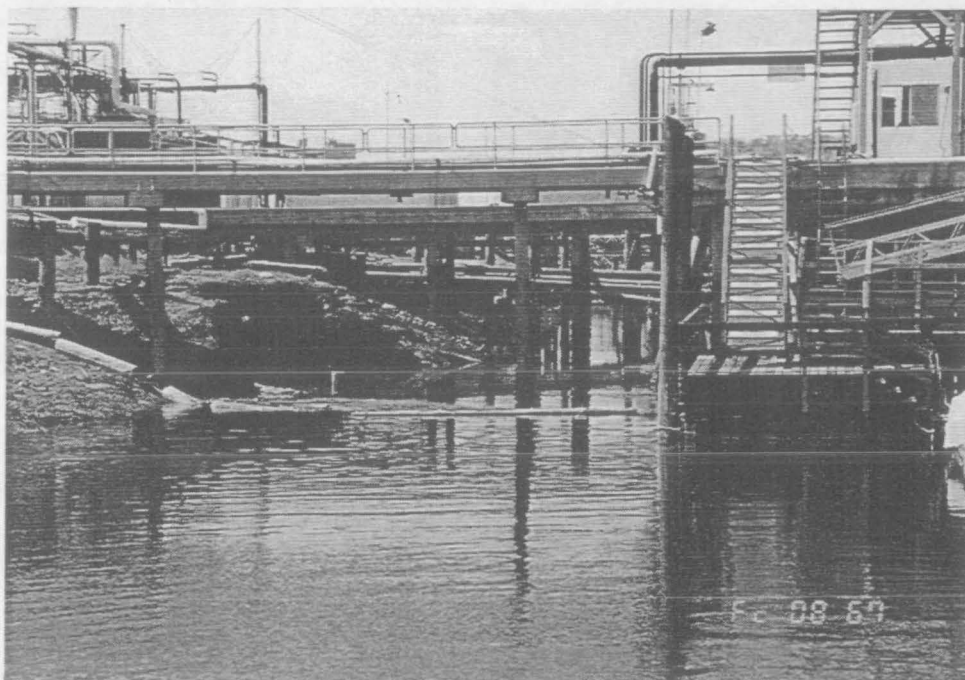


Photo was taken at an estimated tidal height of 1.8 feet

The sampling area extends across the shoreline face behind the main dock. The length of the composite area is approximately 400 feet. There are seven outfall pipes listed on the TPCHD map in the sample composite area (TPCHD No. 57, 58). Elf Atochem North America has an Individual NPDES permit for the discharge of process wastewater and stormwater to the waterway. The bank in this area is full of broken concrete rubble, bricks, and machine parts (Mercuri 1994). Reddish discolorations were noted in the seep area. Based on available studies, problem chemicals which are suspected to be associated with this portion of the site include: perchloroethylene, hexachlorobutadiene, arsenic, chromium, and copper (Tetra Tech 1985, 1988).

Samples for compositing will be collected from the following eight locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance	No.	Distance
1	23	5	201
2	88	6	292
3	139	7	319
4	176	8	371

No photograph available for this sample area

The sampling area extends from the East Channel Ditch on the east to the edge of the main facility. The length of the composite area is approximately 740 feet. There are four outfall pipes listed on the TPCHD map in the sample composite area (TPCHD No. 56, 707, and 702). The bank consists of a sand and mud face and in many places is held in place by a decaying wood bulkhead. Slag was removed from the top of the bank and from the upland area. Based on available studies, problem chemicals which are suspected to be associated with this portion of the site include: perchloroethylene, hexachlorobutadiene, arsenic, chromium, and copper (Tetra Tech 1985, 1988).

Samples for compositing will be collected from the following ten locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance	No.	Distance
1	36	6	435
2	125	7	503
3	200	8	571
4	279	9	664
5	332	10	692





Photo was taken at an estimated tidal height of 1.5 feet

The sampling area extends a short distance to the west from the East Channel Ditch. The length of the composite area is approximately 105 feet. The Ditch is identified by the TPCHD as No. 54. Another outfall pipe listed by the TPCHD had emptied into the ditch, but was capped some time ago (TPCHD No. 55). The mud bank surrounding the mouth of the ditch appears fairly natural. Slag was removed from the top of the bank and from the upland area, but the investigation did not include the intertidal area (Mercuri 1994). Based on available studies, problem chemicals which are suspected to be associated with this portion of the site include: 4-methylphenol, phenol, antimony, arsenic, copper, lead, and zinc (Ecology 1993b). Historically, numerous industries have discharged water and/or wastewater into the ditch. These include Dunlap Towing Co. and Petroleum Reclamation Services, Inc.

Samples for compositing will be collected from the following three locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance
1	49 (2 cores)
2	70 (2 cores)
3	105 (2 cores)



Photo was taken at an estimated tidal height of 0.9 foot

The sampling area extends from the East Channel Ditch on the west to the Kaiser Ditch on the east. The total length of the composite area is approximately 825 feet. However, sampling area 2209I occupies the central 100 feet of this composite length (see Plate 54), therefore only about 725 feet of intertidal shoreline will be sampled for 2208I. There is one listed outfall pipe (TPCHD No. 53) in the sample composite area. The condition of the bank is similar to the sampling area west of the East Channel Ditch. The upland area has undergone extensive cleanup and capping. The lower intertidal area is used as a log raft storage area and appears to be scoured. The majority of activity at the site occurred in the vicinity of the log ramp which will be samples as a separate composite. Based on available studies, problem chemicals which are suspected to be associated with this portion of the site include: 4-methylphenol, phenol, antimony, arsenic, copper, lead, and zinc (Ecology 1993b). The upland area was formerly used by Dunlap Towing Co., Portac, Inc., and Echo Lumber Co. as a log sorting and debarking yard.

Samples for compositing will be collected from the following ten locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance	No.	Distance	No.	Distance	No.	Distance
1	11	4	241	7	547	10	764
2	95	5	318	8	638		
3	213	6	528 <sup>1</sup>	9	736		

<sup>1</sup> The gap in the sampling sequence spans the aea occupied by 2209I.



No photograph available for this sample area

The sampling area extends across the mouth of the log ramp and bisects the previous sampling area. The length of the sample composite area is approximately 100 feet. There is one listed outfall pipe (TPCHD No. 53) adjacent to the sample composite area. The lower intertidal area is used as a log raft storage area and appears to be scoured. Based on available studies, problem chemicals which are suspected to be associated with this portion of the site include: 4-methylphenol, phenol, antimony, arsenic, copper, lead, and zinc (Ecology 1993b). The upland area was formerly used by Dunlap Towing Co., Portac, Inc., and Echo Lumber Co. as a log sorting and debarking yard.

Samples for compositing will be collected from the following two locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance
1	32 (2 cores)
2	66 (2 cores)



Photo was taken at an estimated tidal height of -1.2 feet

The sampling area extends along the shoreline from the eastern boundary of the property. The length of the composite area is approximately 570 feet. The sampling area extends from the eastern property boundary to mid-pier and is primarily under the pier. General Metals of Tacoma, Inc. has an Individual NPDES permit to discharge treated stormwater to the waterway. Although most of the bank is covered by the pier, it appears to be bulkheaded with concrete and wood. The lower bank consists of gravel and cobble. Based on available studies, problem chemicals which are suspected to be associated with this portion of the site include: PAH's, PCB's, arsenic, antimony, chromium, copper, lead, nickel, and zinc (Ecology 1990). General Metals is currently capping the property and installing a storm water drainage and collection system.

Samples for compositing will be collected from the following eight locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance	No.	Distance
1	42	5	365
2	100	6	388
3	200	7	460
4	241	8	552

Unable to take photos due to presence of large ships.

The sampling area extends from the mid portion of the property to the graving slip adjacent to the lower turning basin. The length of the composite area is approximately 475 feet. There is one outfall pipe listed on the TPCHD map in the sample composite area (TPCHD No. 34). General Metals of Tacoma, Inc. has an Individual NPDES permit to discharge treated stormwater to the waterway. The bank on this portion of the property is completely obscured by the dock and ship hulls except at the western edge of the sample composite area. The upper bank in this area contains large and small pieces of concrete rubble and the lower bank appears to be cobble and gravel. Based on available studies, problem chemicals which are suspected to be associated with this portion of the site include: PAH's, PCB's, arsenic, antimony, chromium, copper, lead, nickel, and zinc (Ecology 1990). General Metals is currently capping the property and installing a storm water drainage and collection system.

Samples for compositing will be collected from the following ten locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance	No.	Distance
1	36	6	274
2	68	7	324
3	129	8	376
4	164	9	436
5	212	10	469



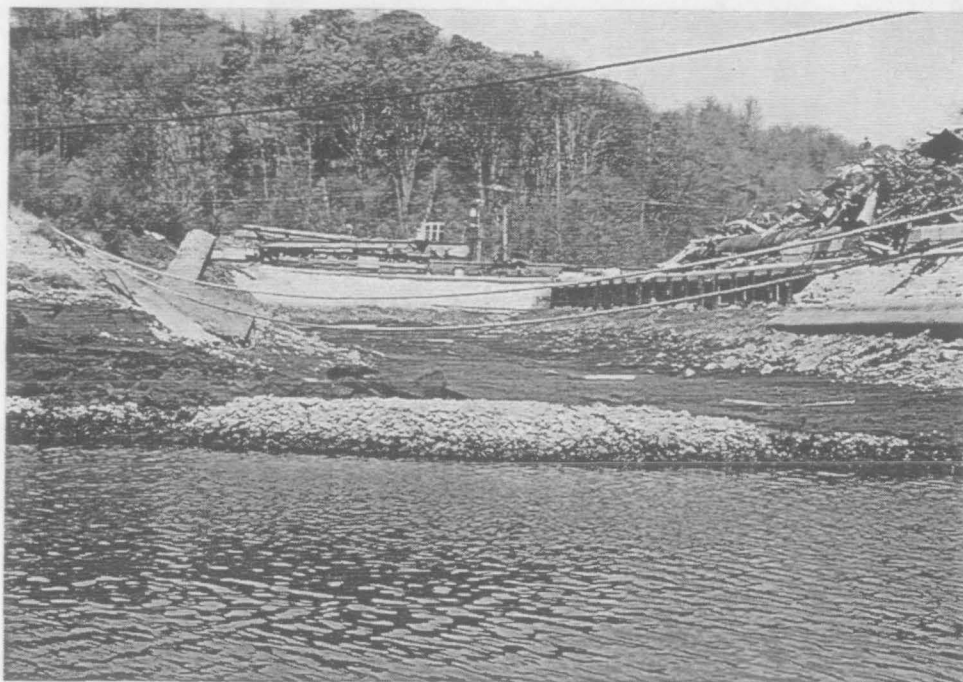


Photo was taken at an estimated tidal height of -1.2 feet

The sampling area is located in the graving slip between the west end of General Metals and the lower turning basin. The length of the composite area is approximately 400 feet. General Metals of Tacoma, Inc. has an Individual NPDES permit to discharge treated stormwater to the waterway. The sampling area extends in a U-shaped pattern around the margins of the graving slip. Portions of the bank appear to have been gunnited to stabilize the top of the bank. The lower portion of the bank consists of gravel, cobble, metal debris, and concrete rubble. The outlet to the graving slip embayment is partially obstructed by a weir which may prevent the free exchange of tidal waters. Based on available studies, problem chemicals which are suspected to be associated with this portion of the site include: PAH's, PCB's, arsenic, antimony, chromium, copper, lead, nickel, and zinc (Ecology 1990). General Metals is currently capping the property and installing a storm water drainage and collection system.

Samples for compositing will be collected from the following eight locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance	No.	Distance
1	29	5	242
2	92	6	298
3	112	7	340
4	185	8	389



Photo was taken at an estimated tidal height of -1.2 feet

The sampling area is located along the beach on the western side of General Metals in the lower turning basin. The length of the composite area is approximately 400 feet. General Metals of Tacoma, Inc. has an Individual NPDES permit to discharge treated stormwater to the waterway. The upper bank in the area is composed of concrete rubble, large rocks, and the remains of old pier pilings. The lower bank is composed of a combination of sand, gravel, cobble and mud. The area at the point contains much coarser sediment with little or no mud. Based on available studies, problem chemicals which are suspected to be associated with this portion of the site include: PAH's, PCB's, arsenic, antimony, chromium, copper, lead, nickel, and zinc (Ecology 1990). General Metals is currently capping the property and installing a storm water drainage and collection system.

Samples for compositing will be collected from the following eight locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance	No.	Distance
1	19	5	218
2	71	6	281
3	117	7	344
4	183	8	385





Photo was taken at an estimated tidal height of -1.2 feet

The sampling area is in the small embayment into which the Morningside Drain empties. The length of the composite area is approximately 175 feet. The drain is identified as TPCHD No. 28. TPCHD drain No. 29 is just outside of the Morningside Ditch. The bank consists of clay with some rubble on the upper bank. The lower bank consists of sand and mud. Based on available studies, problem chemicals found in sediments offshore of the ditch include: PAH's, PCB's, arsenic, copper, lead, nickel, and zinc (Tetra Tech 1985).

Samples for compositing will be collected from the following four locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance	No.	Distance
1	16	3	110
2	88	4	174



Photo was taken at an estimated tidal height of -1.0 foot

The sampling area is located between a small dock and the bank. The length of the composite area is approximately 1060 feet. There are four listed outfalls located in the sampling area (TPCHD No. 25, 26, and 762). The bank is a relatively low, moderately sloping, short mud flat. Some brick debris piles extent into the lower bank. Little is known about the upland activities relative to potential problem chemicals.

Samples for compositing will be collected from the following eleven locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance	No.	Distance
1	46	7	644
2	160	8	775
3	231	9	833
4	356	10	996
5	439	11	1036
6	572		

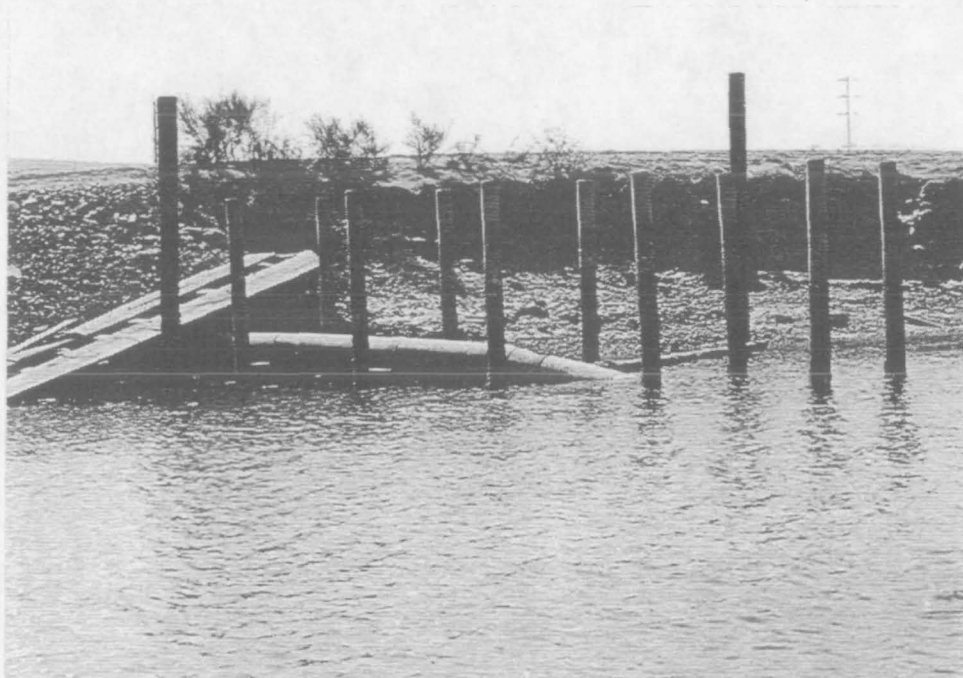


Photo was taken at an estimated tidal height of 0.8 foot

The sampling area is immediately inshore of the outfall at the Kaiser Ditch. The composite area is within 20 feet of the outfall area. The outfall is No. 52 on the TPCHD map. Kaiser Aluminum and Chemical Corp. has an Individual NPDES permit to discharge non-contact cooling water and stormwater to the waterway via the Kaiser Ditch. The bank behind the outfall consists of small rocks with old pilings in the lower intertidal area. The rocks appear to have been used as a berm for the ditch and as ballast for the outfall itself. Based on available studies, problem chemicals found in sediments offshore of the ditch include: PAH's, methylphenol, PCB's, antimony, chromium, copper, lead, and nickel (Amtest 1989, Tetra Tech 1988). Other industries that have discharged water and/or wastewater to the Kaiser Ditch include Ohio Ferro-Alloys Corp., Dunlap Towing Co., Weyerhaeuser Corp., and the Glacier Sand and Gravel Co. (Lone Star Co.).

This sampling area will be one of three areas where blind field splits and replicates will be collected.

Samples for compositing will be collected from the following two locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance
1	15 (2 cores)
2	20 (2 cores)



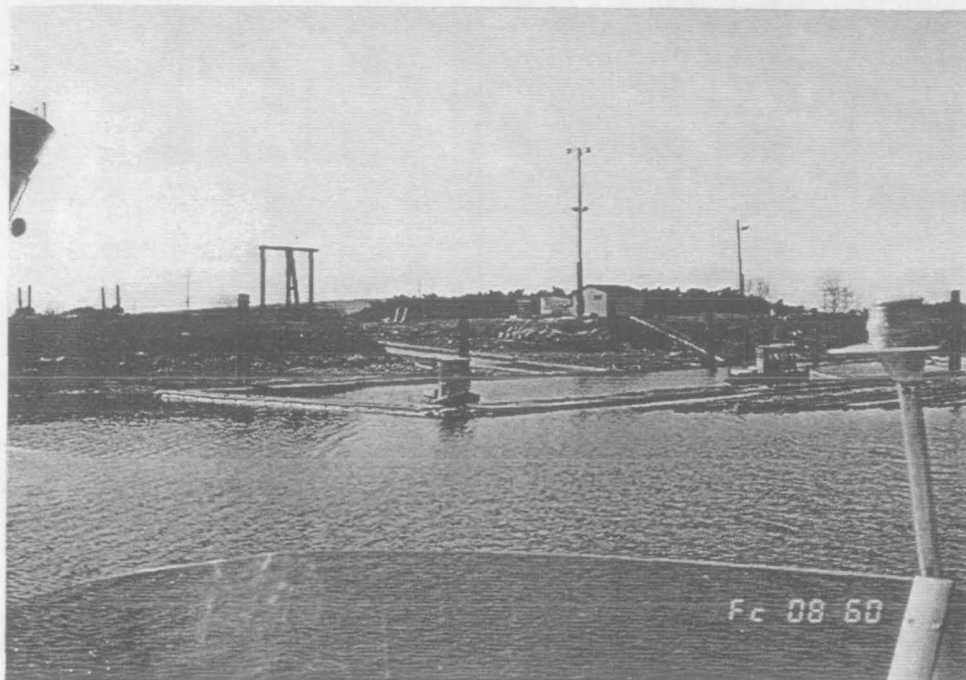


Photo was taken at an estimated tidal height of 0.6 foot

The sampling area extends from the Kaiser Ditch outfall to the edge of the dock at the Weyerhaeuser facility. The length of the composite area is approximately 525 feet. Although there are no outfalls or seeps listed on the TPCHD map in the sample composite area, Weyerhaeuser Corp. has a General NPDES permit to discharge water from an oil/water separator to the city sanitary sewer. The banks appear to consist of concrete rubble, cobble, and gravel. Based on available studies, problem chemicals found in offshore sediments include: PAH's, PCB's, phenols, copper, nickel, and zinc (Tetra Tech 1985, 1988).

Samples for compositing will be collected from the following seven locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance	No.	Distance
1	75	5	314
2	87	6	391
3	159	7	452
4	274		



Photo was taken at an estimated tidal height of 0.3 foot

The sampling area extends the length of the dock at the facility. The length of the composite area is approximately 975 feet. The bank in the area, where visible, consists of concrete rubble and gravel. Based on available studies, problem chemicals found in offshore sediments include: PAH's, PCB's, phenols, copper, nickel, and zinc (Tetra Tech 1985, 1988).

Samples for compositing will be collected from the following ten locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance	No.	Distance
1	61	6	516
2	151	7	611
3	268	8	785
4	331	9	892
5	443	10	921





Photo was taken at an estimated tidal height of 0.1 foot

The sampling area extends across the entire face of the property and includes a small portion of the Weyerhaeuser property. The length of the composite area is approximately 440 feet. There are two listed outfall pipes in the sample composite area (TPCHD No. 48, 816). The upper bank is discolored and the remaining portion down to the low intertidal area is covered with metal, concrete and assorted other debris. The Glacier Sand and Gravel Co., which operated the site previous to Lone Star, had a General NPDES permit to discharge high pH wastewater to the Kaiser Ditch. This discharge violated the pH limits on their permit and Glacier Sand and Gravel Co. was ordered to control the pH (City of Tacoma 1990). The NPDES permit is still in effect.

Samples for compositing will be collected from the following nine locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance	No.	Distance
1	37	6	293
2	59	7	344
3	137	8	383
4	164	9	435
5	224		

**Sample Area 1205I**

**Louisiana Pacific Corp.**

**Plate 65**

This sample is to be a potential source material sample. Its location will be determined at the time of sampling by the HCC and EPA.



Photo was taken at an estimated tidal height of 0.0 feet

The sampling area extends from the west property line with Lone Star to Hylebos Creek. The length of the composite area is approximately 500 feet. There are three listed outfall pipes in the sample composite area (TPCHD No. 47, 46, 45). The bank appears to be discolored in places due to decomposing wood waste, and wood debris is present throughout the area. The top of the bank along the western portion of the sample composite area is ripped with large concrete blocks. Log rafts in the low intertidal have scoured the sediment surface and may make water access difficult. Based on available studies, problem chemicals found in sediments offshore of the site include: arsenic, copper, lead, and zinc (Ecology 1993b).

Samples for compositing will be collected from the following ten locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance	No.	Distance
1	37	6	295
2	85	7	331
3	141	8	395
4	189	9	431
5	211	10	494





Photo was taken at an estimated tidal height of 0.0 feet

The sampling area is located across the mouth of the creek. The length of the composite area is approximately 100 feet and is bisected by the creek. There are no outfalls in the immediate area of the mouth of the creek, however, the Fife Ditch drains into the creek a short distance from the mouth. Ecology sampled sediment for arsenic analysis at 29 locations in the Hylebos Creek and the Fife Ditch in 1993. Four samples exceeded the SQO for arsenic. The exceedance occurred at known arsenic contamination sites (i.e., B & L Landfill, BPA Site, a wood chip pile storage yard, and at the Fife Ditch lift station (Ecology 1993d).

Samples for compositing will be collected from the following two areas along a single horizontal transect that runs along the Hylebos Waterway shoreline and crosses the creek between 0' to +4' MLLW. In the event that a sample location occurs in the creek, the sample will be relocated.

No.	Distance
1	23 (2 cores)
2	77 (2 cores)

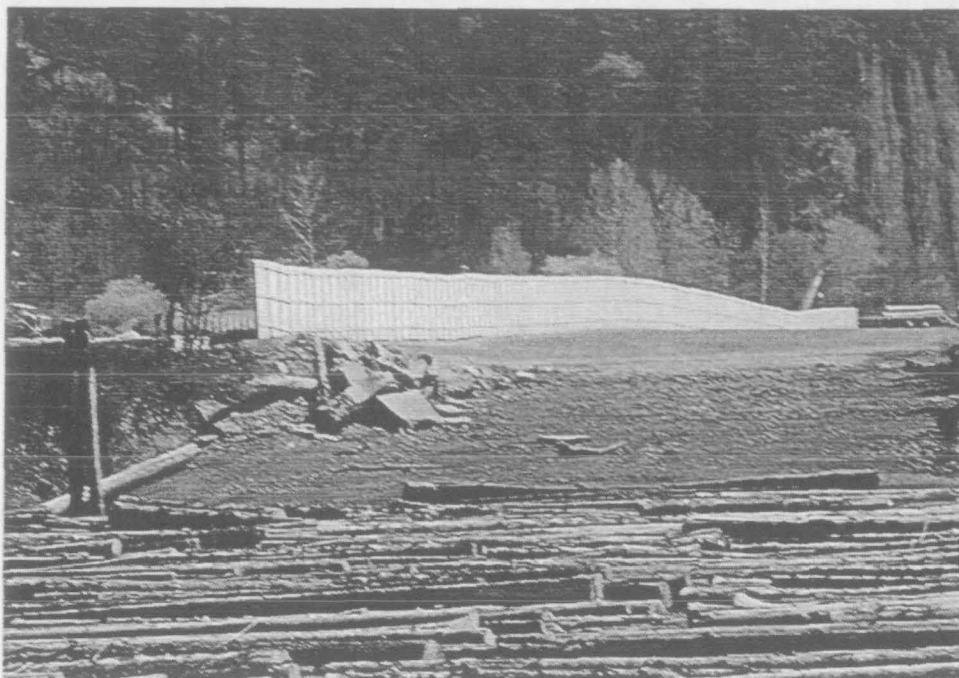


Photo was taken at an estimated tidal height of 0.0 feet

The sampling area encompasses the log ramp adjacent to Hylebos Creek. The length of the composite area is approximately 80 feet. The log ramp is identified as one of two TPCHD drainage ditches (No.724) that empty into the sample composite area. The bank along the log ramp contained slag that was not removed below the +12 ft tide line. A large portion of the lower intertidal area is constantly being blocked by log rafts, making sampling difficult. Based on available studies, problem chemicals found in sediments offshore of the ramp include: arsenic, copper, lead, and zinc (Kennedy/Jenks 1993).

Samples for compositing will be collected from the following two locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance
1	17 (2 cores)
2	74 (2 cores)





Photo was taken at an estimated tidal height of -0.1 foot

The sampling area is located across the front of the property. The length of the composite area is approximately 375 feet. The second of two listed drainage ditches empties into the sample composite area (TPCHD No. 724). This ditch is very difficult to discern without a detailed topographic map (see photograph). The upland area recently underwent a cleanup action. Based on available studies, problem chemicals found in sediments offshore of the ditch include: arsenic, copper, lead, and zinc (Kennedy/Jenks 1993).

Samples for compositing will be collected from the following eight locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance	No.	Distance
1	12	5	232
2	84	6	274
3	138	7	340
4	162	8	368

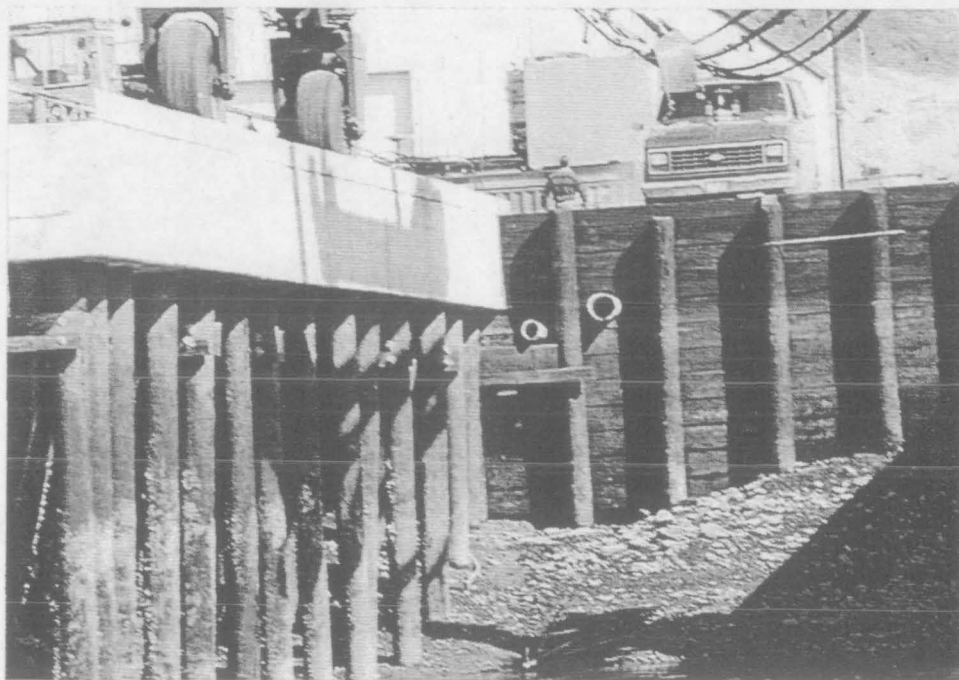


Photo was taken at an estimated tidal height of -0.2 foot

The sampling area extends across the entire shore of the property. The length of the composite area is approximately 240 feet. Three outfall pipes are listed on the TPCHD map as being in the sample composite area (TPCHD No. 42 and 43). Nordlund Boat Building Co. has a small boat NPDES permit that requires boat wash water be recycled. The upper bank along a portion of the property is held in place by a wood bulkhead and the lower area is composed of cobble, gravel, sand, and mud. Construction materials used on site to manufacture fiber glass boats include: xylenes, acetone, and other organic chemicals (Gooding 1990b, Mercuri 1992e).

Samples for compositing will be collected from the following five locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance	No.	Distance
1	45	4	183
2	98	5	236
3	146		

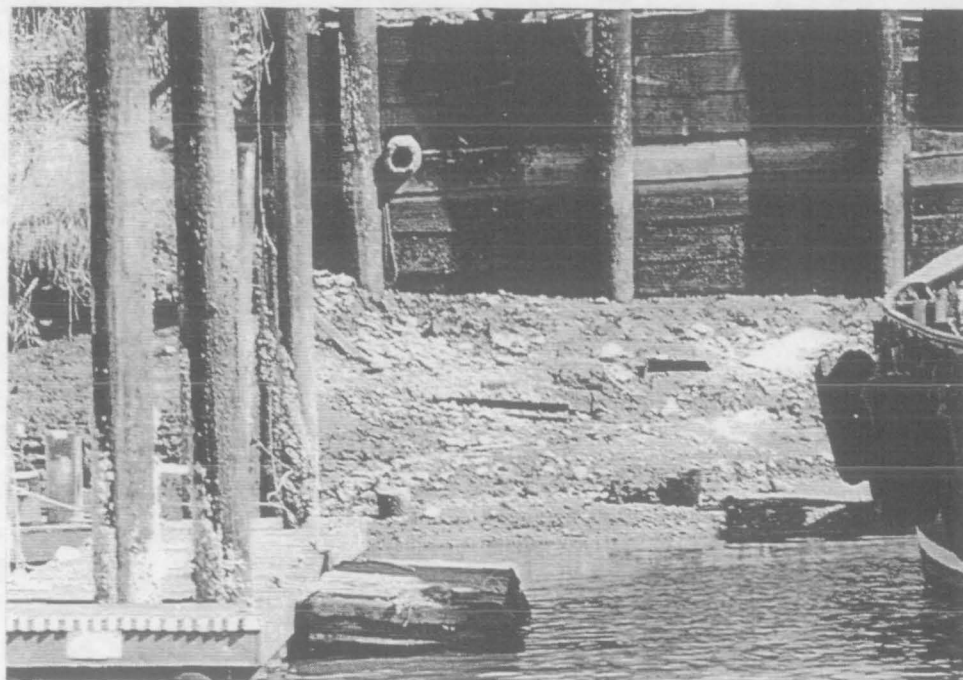


Photo was taken at an estimated tidal height of -0.2 foot

The sampling area extends across the entire shore of the property. The length of the composite area is approximately 125 feet. TPCHD open channel ditch No. 826 is listed as being in the sample composite area. The lower intertidal area is composed of cobble, gravel, sand and mud. Chemicals used by the facility include: trichloroethylene, copper, lead, and zinc (Coleman and Herold 1992).

Samples for compositing will be collected from the following three locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance
1	25 (2 cores)
2	83 (2 cores)
3	124 (2 cores)





Photo was taken at an estimated tidal height of -0.5 foot

The sampling area is located at the boat ramp on the east side of the property. The length of the composite area is approximately 160 feet. Jones-Goodell Corp. has a small boat NPDES permit that requires boat wash water be recycled. The bank in the boat ramp area is partially rip-rapped with concrete rubble. The mid and lower intertidal area consists of cobble, gravel, sand, and mud. Sandblast grit was cleaned up from behind a bulkhead near the marine railway in 1992, but some grit remains upland (Mercuri 1992f).

Samples for compositing will be collected from the following four locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance	No.	Distance
1	18	3	130
2	62	4	158



Photo was taken at an estimated tidal height of -0.5 foot

The sampling area extends behind the dock in the processed lumber portion of the facility. The length of the composite area is approximately 480 feet. There are three listed outfall pipes in the sample composite area (TPCHD No. 821, 822, 823). The top of the bank is bulkheaded in some areas and the middle portion is rip-rapped with concrete rubble. The lower intertidal area consists of cobble, gravel, sand, and mud. Problem chemicals found at low levels associated with the upland operation of the facility include: phenols, phthalates, acetone, chloroform, and toluene (Dunniho 1991). Surface runoff from the upland site contained pentachlorophenol (Gooding 1991b, Coleman 1992c). At one time a portion of the sample composite area was used for boat repair (PRC 1993).

Samples for compositing will be collected from the following ten locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance	No.	Distance
1	30	6	278
2	71	7	311
3	124	8	366
4	162	9	424
5	215	10	468





Photo was taken at an estimated tidal height of -0.8 foot

The sampling area encompasses the area surrounding a large outfall pipe (TPCHD No. 40) and a smaller pipe listed as TPCHD No. 41. The length of the composite area is approximately 200 feet. The upper portion of the bank appears to be fill from log debris, while the middle portion consists of clay, cobble, gravel and sand. The lower intertidal area was not visible due to log rafts. Based on available studies, problem chemicals found in the vicinity of the outfall pipe include PAH's and phenols (Gooding 1991b, Coleman 1992c).

Samples for compositing will be collected from the following four locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance	No.	Distance
1	6	3	146
2	92	4	172



Photo was taken at an estimated tidal height of -0.8 foot

The sampling area will extend across the west end of the upper turning basin at the base of the slope containing large concrete slabs. The length of the composite area is approximately 525 feet. The top of the bank is stacked with raw logs and the entire middle section of the slope is covered with large concrete slabs. Where visible, the lower intertidal area appears to consist of cobble and gravel. Based on available studies, problem chemicals which are suspected to be associated with this portion of the site include: phenols, phthalates, acetone, chloroform, and toluene (Dunniho 1991, Gooding 1991b, Coleman 1992c).

Samples for compositing will be collected from the following seven locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance	No.	Distance
1	49	5	335
2	118	6	379
3	178	7	517
4	249		

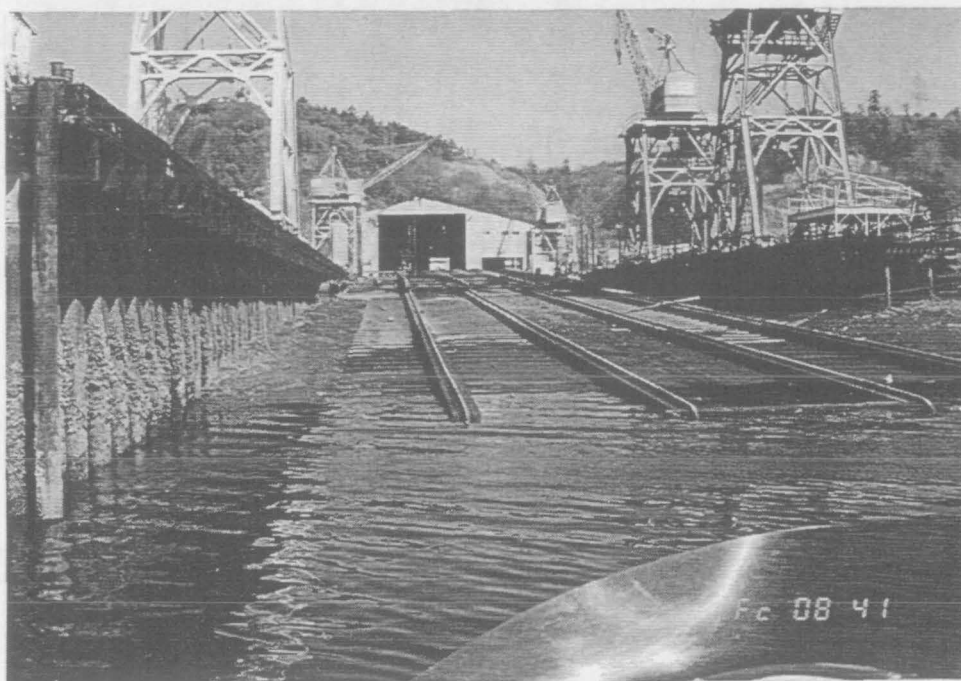


Photo was taken at an estimated tidal height of -0.9 foot

The sampling area encompasses the large boat ramp at the east end of the property. The length of the composite area is approximately 200 feet and is bisected by the ramp. There is one listed outfall pipe (TPCHD No. 815) at the corner of the pier adjacent to the boat ramp. The bank along both sides of the ramp appears to be sand and mud. Based on available studies, problem chemicals which are suspected to be associated with this portion of the site include: methyl ethyl ketone, trichloroethylene, arsenic, copper, lead, and zinc (Ecology and Environment 1979, Gooding 1989).

Samples for compositing will be collected from the following four locations along a single horizontal transect that runs along the waterway shoreline and crosses the boat ramp between 0' to +4' MLLW.

No.	Distance	No.	Distance
1	6	3	130
2	86	4	160





Photo was taken at an estimated tidal height of -1.0 foot

The sampling area is behind the pier along the front of the main facility. The length of the composite area is approximately 630 feet. There are four outfall pipes listed on the TPCHD map in the sample composite area (TPCHD No. 795, 36, 757, 758). The bank behind the dock appears to consist of hardpan clay on the upper portion and a mixture of cobble, gravel, sand, and mud in the lower portion. There also appears to be a substantial amount of debris on the lower portion of the bank. Based on available studies, problem chemicals which are suspected to be associated with this portion of the site include: methyl ethyl ketone, trichloroethylene, arsenic, copper, lead, and zinc (Ecology and Environment 1979, Gooding 1989).

Samples for compositing will be collected from the following nine locations along a single horizontal transect between 0' to +4' MLLW.

No.	Distance	No.	Distance
1	27	6	397
2	127	7	492
3	168	8	556
4	251	9	621
5	331		